

# Clouded Leopard and Small Felid Conservation Summit



Kasetsart University,  
Bangkok, Thailand  
28-30 January 2009





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**Clouded Leopard and Small Felid  
Conservation Summit  
Final Report**

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# Clouded Leopard and Small Felid Conservation Summit

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# Clouded Leopard and Small Felid Conservation Summit Final Report

## Section 1 Executive Summary



## Executive Summary

### Background

Southeast Asia has tremendous diversity in wildlife and is particularly rich in felid species, including nine species of small or medium size wild cats: clouded leopard (mainland SE Asia), Sundaland clouded leopard (Borneo and Sumatra), marbled cat, jungle cat, golden cat, flat-headed cat, fishing cat, Bornean bay cat and leopard cat. Recent findings from field surveys and wildlife trade monitoring indicate that many of these felids may be facing significant population declines due to the impacts of habitat destruction and fragmentation, declining prey base, and targeted hunting. The table below outlines the conservation status of these species according to the 2008 International Union for the Conservation of Nature (IUCN) Red List.

Endangered	Vulnerable	Near Threatened	Least Concern
Bay cat ( <i>Catopuma badia</i> )	Clouded leopard ( <i>Neofelis nebulosa</i> )	Asian golden cat ( <i>Catopuma temmincki</i> )	Jungle cat ( <i>Felis chaus</i> )
Fishing cat ( <i>Prionailurus viverrinus</i> )	Sundaland clouded leopard ( <i>Neofelis diardi</i> )		Leopard cat ( <i>Prionailurus engalensis</i> )
Flat-headed cat ( <i>Prionailurus planiceps</i> )	Marbled cat ( <i>Pardofelis marmorata</i> )		

Accurate assessment of the conservation status of these species is difficult as little is actually known/reported about their natural history, relatively few field surveys have been undertaken, and many of these species have large historic geographic ranges. Due to the wide complement of habitat types utilized by many of these species, the variation in the quality of remaining habitat, and the relatively low natural abundance of these species, it is problematic to generalize survey findings for areas outside study sites. In addition, much of the recent data on the distribution of these felids have been acquired in the course of research on large felids (especially tigers) or non-felid species and is not always disseminated to parties addressing small felid conservation and research issues. As a result, there is a lack of data on the distribution, status, and ecology of small felids to inform conservation planning for these species.

The Clouded Leopard and Small Felid Conservation Summit was conceived to address this issue as well as to facilitate information exchange, communication, and collaboration among the many independent parties working in small felid conservation. The Summit was organized as a three-day workshop intended to serve as a first step toward the development of a holistic conservation strategy for small felids in Southeast Asia. This workshop had four primary objectives:

1. Bring together government agency employees, field researchers, educators, NGO, and zoo staff currently working on (or interested in working on) clouded leopard and small felid research and conservation issues in the Southeast Asian range countries of Thailand, Malaysia, Indonesia, Vietnam, Myanmar, Laos, Cambodia, and Bhutan.
2. Share and compile current data available on clouded leopards and small felids to develop an updated range map for these species across Southeast Asia.
3. Identify key issues concerning the conservation of clouded leopards and small felids, particularly relating to field study, trade, and community education/social marketing.
4. Provide an opportunity to showcase clouded leopard and small felid research and conservation efforts to the public via media participation in the meeting.

## The Workshop Process

Kasetsart University's Faculty of Forestry invited IUCN's Conservation Breeding Specialist Group (CBSG) and IUCN's Cat Specialist Group to facilitate this workshop. Using CBSG tools and processes designed specifically for this type of conservation issue, the workshop brought together a diverse group of 65 participants from 13 countries including field ecologists, population biologists, naturalists, conservation education teachers and zoo professionals.

The first step of the Clouded Leopard and Small Felid Summit was to compile all of the available information and data about these felids in SE Asian range countries. Participants were requested to contribute scientific articles, data and knowledge of the species and its habitat. These materials were distributed in an electronic briefing document in advance of the Summit.

During the workshop, participants worked in small region-based groups to summarize all available information and produce Population and Habitat Tables and distribution maps. Each working group was tasked with creating, in tabular format and on accompanying maps, a detailed description of the location, distribution, and abundance of clouded leopards and other small felids in their region. They were asked to include habitat information including carrying capacity of identified and degree of habitat fragmentation. Discrete patches of suitable habitat were identified and then each was described in terms of quality and presence/absence of felids within each patch. To ensure consistency across groups, workshop participants defined the following terms:

- Detected
  - Photo or direct observation of species; except track of CL in Borneo as no other larger cats occur on Borneo and misidentification is relatively unlikely.
  - 
  - If part of animal (skin, skull), must be entirely sure that it is from the patch.
  - Indicate year and site name (location) of detection
- Undetected
  - Not detected where “sufficient effort” had been expended  
*Sufficient* = where appropriately designed and sufficiently intensive camera trap surveys were conducted for the species
- Unknown
  - Not detected where “insufficient effort” was expended  
*Insufficient* = no camera trap surveys or inappropriate survey design to detect habitat specialists (e.g. for tigers on ridges will not detect fishing cat)

[If possible, qualify by providing indication of survey design, target species, survey effort, size of area surveyed]

- Absent
  - Outside historical distribution
  - Must justify in other cases (survey effort, knowledge of habitat, etc.)

In patches where a species is “detected”, a ranking of High, Medium, Low, or Insufficient Data was given in for:

1. Relative Abundance of species
2. Conservation Value of patch for species
  - Conservation value based on:
    - relative abundance or density of species
    - potential to reverse threats in patch
    - size, quality? and connectivity of patch
  - Clarify the value if relative abundance across a patch varies considerably due to management (e.g. Danum Valley in Borneo, Nam Et-Phou Louey in Northern Highlands of Laos)

Next, the major issues related to clouded leopard and small felid conservation were identified and prioritized. Based on these results, participants further defined the issues and developed goals to achieve the desired change in the conditions identified in the issue statements. Finally, each group developed specific actions, relevant to the situation in the various SE Asian range countries, to accomplish the goals, taking into account the scientific information on the species, their habitats, and the threats identified.

### **Workshop Outcomes**

Below is a summary of the Summit's recommendations. Detailed reports of each working group's deliberations can be found in sections 2 - 6 of this document.

#### **Indochina Working Group**

**Issue:** There is a need for increased information on small felid populations in Indochina to effectively direct conservation initiatives. Without such information, we are unable to assess trends or design appropriate conservation plans and evaluate.

**Actions:**

- Work with relevant ministries to identify national conservation scientists to engage in small felid research and monitoring.
- Link national conservation scientists with international scientific community to gather information on small felid status, distribution and population trends.
- Work with scientific community to standardize methods for monitoring change in small felid populations and distribution. Consider how small felid research can be integrated with existing surveys of large mammals.
- Identify priority areas for small felid research and monitoring.
- Secure more funding for small felids survey and monitoring.
- Establish email group to allow for communication among small felid conservationists throughout SE Asia. Karen Povey has indicated that her agency could potentially serve as the group administrator.

**Issue:** We need to increase political will to ensure implementation of national laws if we are to prevent small felids from extinction.

**Actions:**

- Use information gathered from research and monitoring to inform local authorities involved in the relevant areas to increase understanding of small felid status and threats.
- Increase collaboration between international agencies and the national authorities to encourage political will to protect small felids.
- Provide funds and technical support for local authorities to implement national laws to assure protection of small felids, their habitats and their prey.
- Support independent monitoring of forest crime to ensure proper legal procedures are adhered to.
- Develop standardized methods for monitoring and reporting on wildlife crime (e.g. Law Enforcement Monitoring System - MIST).

**Issue:** Increased awareness among the general public will change behavior and resource demand leading to reduced impacts on wild small felid populations.

**Actions:**

- Identify key audiences and the message that need to be deliver to those audiences regarding small felid conservation.
- Use information on small felids to design and disseminate appropriate awareness materials (e.g. on small cat ecology- the role and importance of small felids in the ecosystem, laws protecting felids and other animals, etc) for various audiences to reduce trade and consumption of small felids, their parts and derivatives (authorities, students, hunters, traders, etc.).
- Provide funding to develop and disseminate awareness materials.

- Where needed, engage other international agencies at key sites to assist with small felid awareness programs.
- Standardize methods to monitor and evaluate the effectiveness of the outreach methods.
- Conduct pre and post surveys of audiences receiving outreach activities to determine change in awareness and behavior over time.

### **Sumatra Working Group**

**Issue:** There is a lack of education and awareness among local people about these species and conservation efforts are less effective without support from key stakeholders. Stakeholders will not support felid conservation without knowing the conservation value of the species.

**Actions:**

- Conduct knowledge, attitude and behavior survey at selected sites.
- Campaign for wild cat conservation through workshops, conservation education, sustainable ecotourism.
- Dissemination of survey reports to the stakeholders.

**Issue:** Illegal logging, encroachment, hunting, and poaching are all problems. Forest degradation and destruction negatively affect the availability of habitat for felids. While there are a lot of rangers, their deployment and actual enforcement is ineffective.

**Actions:**

- Fundraise to strengthen the existing Wildlife Protection Units (increase activity and add more units).
- Create new ones in strategic sites.
- Include small felids as a law enforcement target.
- Assist and monitor the law enforcement efforts.
- Conduct integrated investigation of illegal trade of wild felids throughout Sumatra.

**Issue:** There is an overriding lack of scientific information for these species in Sumatra, such as how the species co-exist with tigers and each other, and what habitat they use. This makes it difficult to know what issues affect these species. Without having basic data on their population status and ecology it is difficult to implement effective conservation initiatives.

**Actions:**

- Initiate studies to improve knowledge on felid population status, distribution and ecology.
- Identify common and robust methods to investigate their population status, ecology and major threats.

### **Borneo Working Group**

**Issue:** There is a lack of baseline data on Bornean felid distribution, abundance, population trends, ecological needs, and their response to key threats. This lack of data precludes the development of effective conservation and management strategies.

**Actions:**

- Conduct studies to increase our knowledge of felid status distribution and ecology.
- Conduct ecological studies to increase our knowledge of felid response to anthropogenic change
- Conduct long-term studies to collect population data (min 5yrs, recommended 10yrs)
- Conduct studies to investigate the effects of habitat fragmentation on felids
- Conduct social surveys to determine human impact on felids (direct and indirect hunting)

**Issue:** The lack of standardized felid assessment methods and communication among researchers limits the understanding of the broad-scale conservation situation. This lack also precludes direct comparisons of field data, thereby reducing the efficient use and impact of conservation resources.

**Actions:**

- Continue to work together to develop a standardized system for monitoring felids.

- Create an online forum for discussion between researchers, biologists and educators working in Borneo.
- Produce a standard methods manual for surveying and monitoring.

**Issue:** A broad lack of adequate knowledge of wildlife and conservation issues among rural and city dwellers (non-governmental stakeholders including plantation land-owners, and local community members both adults and children) resulting in behaviors that are detrimental to felid conservation.

**Actions:**

- Develop, implement, and evaluate the effectiveness of education programs for sites across Borneo.

**Issue:** There is difficulty identifying sufficiently trained and/or motivated candidates from within range countries to sustain research and environmental education programs.

**Actions:**

- Provide and promote training courses of local and international universities
- Provide funding for interested candidates to participate in these courses.

**Southern Thailand / Peninsular Malaysia Working Group**

**Issue:** Research data are needed to better understand population status and distribution to determine priority areas for conservation intervention.

**Actions:**

- Develop a comprehensive research plan.
- Ensure sufficient research capacity.
- Ensure accessibility/ availability of adequate funding.

**Issue:** Lack of education and awareness results in overuse/misuse of natural resources and indifference to loss and effect on biodiversity.

**Action:**

- Develop education and awareness programs for public/ government.

**Issue:** Lack of communication results in failure to implement available research findings and causes duplication of effort.

**Actions:**

- Establish a communication network among researchers.
- Develop a framework for mainstreaming research data in the Government sector (local and federal) as well as research institutions.

**Issue:** Animal trade causes depletion of wild cat populations, which could negative affect the demographics of the focal species and prey abundance.

**Action:**

- Reduction of occurrences of illegal trade in cats.

**Issue:** Lack of clear and holistic government policies and/or implementation results in habitat loss degradation/loss and eventual loss of biodiversity.

**Actions:**

- Development of clear Government policies, plans and programs (PPPs).
- Ensure implementation of PPPs.

**Issue:** Prey depletion reduces food availability, which can adversely affect survival of clouded leopards.

**Action:**

- Reduction in hunting activities of CL prey.

### **Myanmar Working Group**

**Issue:** People living near felid habitats are poor and don't have enough food to eat, so they eat wildlife indiscriminately for food, leading to declines in felid populations

**Actions:**

- Conduct wildlife awareness presentations with target groups (IndoMyanmar Conservation; Friends of Wildlife - local NGOs)
- Make agreements and provide incentives to local people to find other sources of protein (IndoMyanmar Conservation; Friends of Wildlife - local NGOs)

**Issue:** People in local government and local communities don't understand the importance of felids nor the effect of hunting or shifting cultivation on their populations

**Actions:**

- Provide food supplements (rice), community forest plantation or private plantations on 30 yr land tenure; and provide at least one school teacher for each community
- Study hunting patterns, determine areas used to trap and snare wildlife, remove traps/snares (IndoMyanmar Conservation; Friends of Wildlife - local NGOs)

**Issue:** People are poor so they sell skins of clouded leopards and meat of all felids to raise money to buy rice

**Actions:**

- Conduct wildlife awareness presentations with target groups (IndoMyanmar Conservation; Friends of Wildlife - local NGOs)
- Increase patrolling efforts inside the forest reserves by providing training and support for patrol teams (Forest Dept)
- Monitor wildlife markets at Prome and Minbu for illegal trade (Police, township authorities)
- Check roadside restaurants near the forest reserves (Police, township authorities)
- Provide incentives to enforcement staff to support more effective enforcement of markets and restaurants (IndoMyanmar Conservation; Friends of Wildlife - local NGOs)

**Issue:** Insufficient management, roles and responsibilities of conservation staff not clearly defined. There are many more staff assigned than actually in the protected areas.

**Actions:**

- Provide training in patrolling and wildlife protection and survey techniques
- Provide equipment and field allowances

**Issue 5:** Loss and destruction of felid habitats arising when influential people build goldmines and plantations. poor people do shifting cultivation, and the military build camps inside protected areas.

**Actions:**

- Conduct wildlife awareness presentations (WCS)
- Make agreements and provide incentives to local people to find other sources of protein (TNRP, WCS)

**Issue 6:** Lack of international cooperation, including border controls, CITES enforcement

**Actions:**

- Higher level discussions (e.g. ASEAN, Ministerial) about wildlife trade
- Training of border enforcement staff about wildlife trade (e.g. Forest Dept, Military, CITES, Customs)

**Issue :** Destructive forestry harvest practices

**Actions:**

- Initiate dialogue with concerned stakeholders

**Issue:** Lack of research, scientific knowledge about felids

**Actions:**



- Conduct surveys and ecological research inside the Wildlife Sanctuary (IndoMyanmar Conservation; Friends of Wildlife - local NGOs)
- 

#### **North and Central Thailand Working Group**

**Issue:** Agarwood poaching is frequent and widespread (Thais and Cambodians), with tremendous financial incentive for the poachers. It involves groups of people in the forest for extended periods of time poaching (via snares and by-catch) as they move. This subsistence hunting results in the direct mortality of adult animals, which can drive populations to extinction.

#### **Actions:**

- Control human activities and consequently stop poaching/activities that degrade habitat.
- Increase knowledge regarding cat population numbers and trends, so we can tell if our protection activities are helpful. The first step in this includes research priorities.
- Use modified protocols for current tiger monitoring to establish un-surveyed habitats and proper distance between trail cameras for monitoring small felids.
- Attempt to expand habitats currently being sampled (change spacing of cameras and/or habitat).

**Issue:** There is inconsistent management and ranger training across the DYKY complex. Uneven enforcement of laws and regulation leads to increased mortality of felid species in surrounding areas. While there is good patrolling in Khao Yai, the rest of the complex does not have good patrolling and therefore more poaching occurs. There is no continuity in policies. No limits are placed on tourism, which is poorly managed. Tourism is a priority for the park above conservation, which leads to increased poaching, direct mortality by vehicle collisions, increased vehicle exhaust, increase in zoonotic disease transmission (from domestic animals and vehicles), and habitat degradation.

#### **Action:**

- Increase education and public awareness of clouded leopards and other small felids.

#### **OVERALL WORKSHOP RECOMMENDATIONS:**

1. Create an ongoing communication network to maintain relationships initiated during the Summit, provide a forum for discussing and debating research methodology and other pertinent issues, and to facilitate future collaboration. Since the Summit, a Yahoo group, *SoutheastAsianWildCats*, has been established and all participants have been invited to join. The group is moderated by Karen Povey, President and CEO, Clouded Leopard Project
2. Convene a follow-up meeting after 3 years to maintain momentum and move forward with clouded leopard and small felid conservation.



**Clouded Leopard and Small Felid  
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Final Report**

**Section 2  
Indochina Working Group Report**



## **Indochina (Laos, Vietnam, Cambodia) Working Group**

*Members: Po-Jen Chiang, Arlyne Johnson, Thananh Khotpathoom, Barney Long, Nick Marx, Nguyen Van Nhuan*

### **Data Assembly and Evaluation**

Information on the smaller felids of Indochina was compiled by the group members. While the experience and knowledge of the group is varied we acknowledge that information presented here is not comprehensive either per species or geographic location.

Knowledge on the smaller felids in Indochina remains limited due to the constraints of social unrest that have plagued the region until recently. As such information provided here remains qualitative as quantitative information is not available.

The region was divided into sub-regions on which all analyses were conducted. These sub-regions represent areas of similar ecological conditions and not contiguous habitat blocks. In fact most of these sub-regions represent numerous unconnected habitat blocks and are fragmented by roads, agriculture or other barriers. However for the sake of consistency they are termed “patches” here.

The presence of species in each patch was determined using a system of categories. Moreover population sizes and changes in populations could not be estimated it was simply described. Presence categories were defined as follows:

Present/Detected:	Species confirmed as present within the patch through camera-trapping or direct observation within the previous 10 years
Probable (first exercise only):	Species could be present due to known habitat needs and known historical range, but not confirmed in the past 10 years through direct observation or camera-trapping to the best knowledge of the group
Unknown (second exercise only):	Species possibly present based on habitat and presumed distribution but as yet unconfirmed by camera-trapping or direct observation
Absent:	Outside the known distribution of the species either geographically or ecologically

Threats were described for each patch based on the knowledge of the group members and so represent those threats known to the group and other threats maybe present but unknown to the group.

## POPULATION AND HABITAT DATA for major patches in Indochina

### Region: INDOCHINA

Species: Listed in first line. CL=Clouded Leopard, GC=Golden Cat, MC=Marbled Cat, LC=Leopard Cat, FC=Fishing Cat, JC=Jungle Cat.

### Habitat type(s): (see polygon description)

Parameter	P1 (N. Vietnam Limestone)	P2 (Hoang Lien)	P3. (Northern Highlands-Lao & Vietnam)	P4. (Northern Annamites-Lao, Vietnam & Cambodia)
Presence/absence of species	Present-CL,LC,GC Probable-MC	Present-CL,MC, GC, LC	Present in both countries-CL, MC, GC, LC	Present-CL, MC, GC, LC, FC (FC in Xe Sop survey-RS-1998)
Estimated population size (or estimated range)	CL- Possibly still widely distributed across the polygon but highly fragmented with very few forest areas of significant size. Probably no area has a viable population with limited connectivity. Plus habitat not ideal for the species. GC-Possibly ok in larger fragments. LC-Fragmented but likely viable in a few fragments.	CL-Good block of habitat but montane-really steep. Thus, densities likely low even without hunting. Area has high hunting pressure. Low densities; possibly lack of reproduction. MC-?, GC & LC-possibly doing OK but low due to heavy hunting pressure.	CL, MC, GC -where actively protected (e.g. northeastern Laos) or less hunting due to limited access), low numbers but viable populations present. LC-low numbers but viable throughout most of area. (Note: no areas actively protected in Vietnam part of polygon)	CL, MC, GC, LC-All at extremely low numbers.
Trend in population size (stable/declining/increasing)	CL-decreasing GC-decreasing. LC-stable; possibly declining?	CL, GC-decreasing MC-uncertain LC-stable; possibly declining?	CL, GC, MC-Declining throughout except where actively protected. Possibly stable in areas with limited access. LC-stable?	CL, MC, GC, LC-decreasing in all areas.
Reasons for absence/decline, if appropriate	Hunting; possibly small pop. size in fragments; larger blocks still fragmenting; habitat degradation (due to fuelwood collection); disturbance due to tourism in a small area.	Hunting; likely low viability given possibly large home ranges and lack of prey.	Direct hunting and hunting of prey.	Hunting!!! Forest loss driven by plantations on the increase in Vietnam. Forest fragmentation drive by infrastructure.
Estimated carrying capacity / habitat saturation	CL-Patch probably not viable; low potential for recovery. Likely will lose the species from this polygon. LC, GC-would be viable if protected.	All species-Potential for viable population if prey recovery and protection from hunting.	For all except LC, within the available habitat, population could likely be an estimated 5x greater if current threats eliminated.	Populations of forest cats could likely be some of the highest in the region if hunting eliminated.
Projected future trend in carrying capacity (habitat area and/or quality)	Expect decrease in quality and area.	No expected change in habitat area or quality.	Likely to decrease due to habitat loss and degradation.	May decrease to some degree; somewhat protected by topography.
Current connectivity with other patches	Lack of connectivity to other habitat.	Connected to similar habitat in China.	Currently connected to northern Annamites and dry evergreen habitats.	Currently well connected to dry evergreen and dipterocarp forests.

Parameter	P1 (N. Vietnam Limestone)	P2 (Hoang Lien)	P3. (Northern Highlands-Lao & Vietnam)	P4. (Northern Annamites-Lao, Vietnam & Cambodia)
Potential for future connectivity with other patches.	None	None	None in Vietnam; some possible in Laos depending on land use practices.	Low potential; more likely to decrease.
Projected future fragmentation / loss of connectivity	Not relevant.	Polygon could be fragmented further if no action taken.	Polygon could be fragmented further if no action taken	Possible fragmentation from adjacent polygons.
Parameter	P5 (Dry dipterocarp mosaic-Lao, Vietnam and Cambodia)	P6 (Southern Annamites-Vietnam & Cambodia)	P7. (U Minh-Mekong Delta in Vietnam)	P8. (Cardamon Mountains-Cambodia)
Presence/absence of species	Present-JC, LC, CL, MC, GC, FC. Dipterocarp forest with evergreen patches	Present-LC, CL,GC, MC, FC	Present-LC, FC.	Present-CL, MC, GC, LC, Possible-JC, FC? (?FFI; Jenny Daltry)
Estimated population size (or estimated range)	LC-Fine; JC-Locally abundant but status throughout the area unknown. Others unknown. [This is a mosaic of dry dipterocarp with semi-evergreen and evergreen on the hills]	LC, CL, GC, MC-Habitat very good quality. Large areas of contiguous forest, not too steep, good altitude range (in Vietnam, relatively low hunting pressure but high relative to rest of region)	Maximum-60,000 ha of forest.	Huge area of forest from mangroves to submontane; continuous forest with little fragmentation. Populations heavily depressed throughout.
Trend in population size (stable/declining/increasing)	In actively protected areas (in Cambodia) populations increasing. All other areas populations likely decreasing due to threats.	All likely decreasing expect LC may be stable.	Possibly stable but fragmented in the polygon.	Where actively protected, populations stable and possibly increasing.
Reasons for absence/decline, if appropriate	Hunting & forest loss (due to conversion to agriculture, plantations, logging, mining and hydropower). The role of fire in this habitat not well understood.	Hunting; habitat loss for plantations and agriculture. Also illegal and legal logging in Vietnam. Mining and infrastructure.	Limited hunting; forest loss due to plantation; overfishing; water pollution	Hunting. Forest loss due to plantations and agriculture.
Estimated carrying capacity / habitat saturation	The most important habitat for JC in Southeast Asia. For forest cats, the evergreen patches in the mosaic are small and marginal.	All -Potential for viable population if prey recovery and protection from hunting and if habitat loss arrested (esp Vietnam)	Possibly could increase both FC and LC.	All populations with enormous potential for increase.
Projected future trend in carrying capacity (habitat area and/or quality)	Expect decrease in quality and area.	Habitat area will likely increase; quality may also decrease.	Expect decrease but could intervene with increasing habitat.	Should remain stable due to active protection.
Current connectivity with other	Relative good connectivity.	Connected to some degree to	Isolated	Isolated but a very large area – 1 million ha.

Parameter	P5 (Dry dipterocarp mosaic-Lao, Vietnam and Cambodia)	P6 (Southern Annamites-Vietnam & Cambodia)	P7. (U Minh-Mekong Delta in Vietnam)	P8. (Cardamon Mountains-Cambodia)
patches		dry forest (e.g. near Seima)		
Potential for future connectivity with other patches	Likely lose in the south and east/west of the Mekong.	Unlikely.	None	None
Projected future fragmentation / loss of connectivity	Not relevant.	Like more fragmented in the future.	Potential for loss but also for restoration.	No relevant.



Parameter	P9 (Tonle Sap)	P10 (Cambodian Dry Evergreen)	P11. (Lao Dry Evergreen)
Presence/absence of species	Possible-LC, FC? (contact CI for confirmation)	Probable-CL, GC, MC, LC Possible-FC	Present-CL, GC, MC, LC
Estimated population size (or estimated range)	If present, likely decreasing due to habitat alteration.	Likely depressed populations due to heavy hunting/logging	Depressed due to heavy hunting
Trend in population size (stable/declining/increasing)	If present, likely in decline	Decreasing	Declining except in areas of active protection (Nam Kading) where possibly stable.
Reasons for absence/decline, if appropriate	Human pressure, forest clearance for agriculture, overfishing, hunting, hydropower development.	Hunting, logging	Hunting, logging
Estimated carrying capacity / habitat saturation	Likely could increase if present	Could be much higher	Could be much higher
Projected future trend in carrying capacity (habitat area and/or quality)	Likely decrease due to threats	Continued decline	Likely will decline if threats of logging and habitat loss not arrested.
Current connectivity with other patches	None	Reasonable to Northern Plains	Well connected.
Potential for future connectivity with other patches		Unlikely	Low unless intensive efforts in protection of habitat.
Projected future fragmentation / loss of connectivity		Like more fragmented in the future	Likely to increase.

Species	(N. Vietnam Limestone)	P2 (Hoang Lien)	P3 (Northern Highlands-Lao & Vietnam)	P4 (Northern Annamites-Lao, Vietnam & Cambodia)	P5 (Dry dipterocarposic-Lao, Vietnam and Cambodia)	Annamites-Vietnam & Cambodia)	P7. (U Minh-Mekong Delta in Vietnam)	P8. (Cardamon Mountains-Cambodia)	P9 (Tonle Sap)	P10 (Cambodian Dry Evergreen)	P11. (Lao Dry Evergreen)
Clouded leopard	Detected	Detected	Detected	Detected	Detected	Detected	Unknown	Detected	Unknown	Unknown	Detected
Marbled cat	Unknown	Detected	Detected	Detected	Unknown	Detected	Unknown	Detected	Unknown	Unknown	Detected
Golden cat	Unknown	Detected	Detected	Detected	Detected	Detected	Unknown	Detected	Unknown	Detected	Detected
Leopard cat	Detected	Detected	Detected	Detected	Detected	Detected	Detected	Detected	Unknown	Detected	Detected
Fishing cat	Absent	Absent	Unknown	Detected	Detected	Detected	Detected	Unknown	Unknown	Unknown	Unknown
Jungle cat	Absent	Absent	Unknown	Absent	Detected	Unknown	Absent	Unknown	Unknown	Unknown	Unknown

## **Identification of Key Issues Affecting Felids in Indochina**

### **(Laos, Vietnam, Cambodia)**

- Hunting cats for trade
- Hunting prey for trade
- Hunting prey for subsistence
- Habitat loss / conversion
- Habitat degradation (removal of trees and structure)
- Habitat disturbance (human presence)
- Water pollution
- Disease in low density populations
- Mining, hydropower and infrastructure (dams, roads)
- Human – cat conflict (dislike of cats)
- Prey depletion due to overfishing
- Lack of political will to implement and enforce laws
- Lack of awareness of impact of overharvest on cat and prey populations
- Lack of data and surveys on the distribution and status of small felid populations
- Lack of monitoring of trends in small felid populations
- Lack of awareness of small felids in the range countries
- Lack of funding for small felid surveys and monitoring
- Lack of national conservation scientists
- Are international agencies supporting the highest priority activities to result in small felid conservation?

<b>Issue / threat</b>	<b>P1 (N. Vietnam Limestone)</b>	<b>P2 (Hoang Lien)</b>	<b>P3. (Northern Highlands-Lao &amp; Vietnam)</b>	<b>P4. (Northern Annamites-Lao, Vietnam &amp; Cambodia)</b>	<b>P5 (Dry dipterocarp-Lao, Vietnam and Cambodia)</b>
Hunting for cats and prey	X	X	X	X	X
Illegal trade of cats and prey	X	X	X	X	X
Habitat loss / conversion	X	X	X	X	X
Habitat degradation (removal of trees and structure)	X	X	X	X	X
Habitat disturbance (human presence)	Present but low threat	Present but low threat	Present but low threat	Present but low threat	Present but low threat
Water pollution					
Disease in low density populations	Possible?	Possible?	Possible?	Possible?	Possible?
Mining, hydropower and infrastructure (dams, roads)	Present in small areas of patch	Present in small areas of patch	Present in small areas of patch	Present in small areas of patch	Present in small areas of patch
Lack of political will to implement and enforce laws	Present except where active management	Present except where active management	Present except where active management	Present except where active management	Present except where active management

<b>Issue / threat</b>	<b>P1 (N. Vietnam Limestone)</b>	<b>P2 (Hoang Lien)</b>	<b>P3. (Northern Highlands-Lao &amp; Vietnam)</b>	<b>P4. (Northern Annamites-Lao, Vietnam &amp; Cambodia)</b>	<b>P5 (Dry dipterocarp-Lao, Vietnam and Cambodia)</b>
Lack of awareness of impact of overharvest on cat and prey populations	X	X	X	X	X
Lack of data and surveys on the distribution and status of small felid populations.	X	X	X	X	X
Lack of monitoring of trends in small felid populations	X	X	X	X	X
Lack of awareness of small felids in the range countries	X	X	X	X	X
Lack of funding for small felid surveys and monitoring	X	X	X	X	X
Lack of national conservation scientists	X	X	X	X	X
Human – cat conflict (dislike of cats)	Present but scale unknown	Present but scale unknown	Present but scale unknown	Present but scale unknown	Present but scale unknown

Issue / threat	P6 (Southern Annamites-Vietnam & Cambodia)	P7. (U Minh-Mekong Delta in Vietnam)	P8. (Cardamon Mountains-Cambodia)	P9 (Tonle Sap)	P10 (Cambodian Dry Evergreen)	P11. (Lao Dry Evergreen)
Hunting for cats and prey	X	X	X	X	X	X
Illegal trade of cats and prey	X	X	X	X	X	X
Habitat loss / conversion	X	X	X	X	X	X
Habitat degradation (removal of trees and structure)	X	X	X	X	X	X
Habitat disturbance (human presence)	Present but low threat	Present but low threat	Present but low threat	Present but low threat	Present but low threat	Present but low threat
Water pollution		X		X		
Disease in low density populations	Possible?	Possible?	Possible?	Possible?	Possible?	Possible?
Mining, hydropower and infrastructure (dams, roads)	Present in small areas of patch	Present in small areas of patch	Present in small areas of patch	Present in small areas of patch	Present in small areas of patch	Present in small areas of patch

<b>Issue / threat</b>	<b>P6 (Southern Annamites-Vietnam &amp; Cambodia)</b>	<b>P7. (U Minh-Mekong Delta in Vietnam)</b>	<b>P8. (Cardamon Mountains-Cambodia)</b>	<b>P9 (Tonle Sap)</b>	<b>P10 (Cambodian Dry Evergreen)</b>	<b>P11. (Lao Dry Evergreen)</b>
Lack of political will to implement and enforce laws	Present except where active management	Present except where active management	Present except where active management	Present except where active management	Present except where active management	Present except where active management
Lack of awareness of impact of overharvest on cat and prey populations	X	X	X	X	X	X
Lack of data and surveys on the distribution and status of small felid populations.	X	X	X	X	X	X
Lack of monitoring of trends in small felid populations	X	X	X	X	X	X
Lack of awareness of small felids in the range countries	X	X	X	X	X	X

<b>Issue / threat</b>	<b>P6 (Southern Annamites-Vietnam &amp; Cambodia)</b>	<b>P7. (U Minh-Mekong Delta in Vietnam)</b>	<b>P8. (Cardamon Mountains-Cambodia)</b>	<b>P9 (Tonle Sap)</b>	<b>P10 (Cambodian Dry Evergreen)</b>	<b>P11. (Lao Dry Evergreen)</b>
Lack of funding for small felid surveys and monitoring	X	X	X	X	X	X
Lack of national conservation scientists	X	X	X	X	X	X
Human – cat conflict (dislike of cats)	Present but scale unknown	Present but scale unknown	Present but scale unknown	Present but scale unknown	Present but scale unknown	Present but scale unknown



## **Prioritization of Threats**

We identified threats as high, medium and low. For each level, we identified whether our agencies or organizations currently had a strategy in place for addressing the threat or not. If not, we suggested that a strategy be developed. We developed strategies for high priority threats.

- 1. High threat - develop strategy**
  - a. Lack of small felid research and monitoring (status, distribution, population trends, national conservation scientists)
  - b. Lack of political will to implement national laws
  - c. Lack of awareness of
    - i. Small felids
    - ii. Impact of overharvest on cat and prey populations
- 2. High threat - strategy exists or not needed for small felid conservation**
  - a. Hunting cats and prey for trade
- 3. Medium threat - develop strategy**
  - a. Hunting prey for subsistence (CL-High; other felids-Low?)
  - b. Water pollution and overfishing (Fishing Cat)
- 4. Medium threat - strategy exists or not needed for small felid conservation**
  - a. Habitat loss / conversion
- 5. Low threat - develop strategy**
  - a. Human-cat conflict
  - b. Disease in low density populations (need research and monitoring)
- 6. Low threat - strategy exists or not needed for small felid conservation**
  - a. Habitat disturbance
  - b. Mining, infrastructure, hydropower
  - c. Habitat degradation

## Issues, Goals and Actions for Felid Conservation in Indochina

**Issue Statement 1.** Need increased information on small felid populations in Indochina to effectively direct conservation initiatives.

Whys?

Lack of small felid research and monitoring

↓

Lack of information on distribution, status, trends

↓

Without information unable to assess trends or design appropriate conservation plans and evaluate.

**Goal 1.** Population distribution and status of all small felids in Indochina is clearly understood and relevant areas of key populations identified.

**Goal 2.** National capacity exists to implement ongoing felid research and monitoring.

**Goal 3.** In relevant areas of key populations, monitoring shows an improved status of the species.

**Actions to reach goals 1, 2 and 3 are:**

- **Action:** Work with relevant ministries to identify national conservation scientists to engage in small felid research and monitoring.
- **Action:** Link national conservation scientists with international scientific community to gather information on small felid status, distribution and population trends.
- **Action:** Work with scientific community to standardize methods for monitoring change in small felid populations and distribution. Consider how small felid research can be integrated with existing surveys of large mammals.
- **Action:** Identify priority areas for small felid research and monitoring.
- **Action:** Secure more funding for small felids survey and monitoring.
- **Action:** Establish email group to allow for communication among small felid conservationists throughout SE Asia. Karen Povey has indicated that her agency could potentially serve as the group administrator.
- **Responsible parties** for these actions will have to be determined in country through consultation with relevant organizations and authorities.
- **Measures of success:** Over time, we expect to see an increase in small felid populations, increase in national conservation scientists, increase in funding, increase of surveyed areas and knowledge of small felids in the region.

**Issue Statement 2.** We need to increase political will to ensure implementation of national laws if we are to prevent small felids from extinction.

Whys?

Lack of political will to implement national laws

↓

Without implementing national laws, small felids will go extinct

**Goal 1.** National governments are implementing laws to protect small felids.

- **Action:** Use information gathered from research and monitoring to inform local authorities involved in the relevant areas to increase understanding of small felid status and threats.
- **Action:** Increase collaboration between international agencies and the national authorities to encourage political will to protect small felids.

- **Action:** Provide funds and technical support for local authorities to implement national laws to assure protection of small felids, their habitats and their prey.
- **Action:** Support independent monitoring of forest crime to ensure proper legal procedures are adhered to.
- **Action:** Develop standardized methods for monitoring and reporting on wildlife crime (e.g. Law Enforcement Monitoring System - MIST).
- **Responsible parties** for these actions will have to be determined in country through consultation with relevant organizations and authorities.
- **Measures of success:** Over time, we expect to see an increase in the implementation of national laws, a reduction in wildlife crime, which would contribute to an increase in small felid populations.

**Issue Statement 3. Increased awareness among the general public will change behavior and resource demand leading to reduced impacts on wild small felid populations.**

Whys?

Lack of awareness of small felids and the importance of small felid conservation

↓

A more informed general public is more likely to change behavior to be more supportive of felid conservation

↓

A change in behavior among the general public will decrease demand for small felid products

↓

Reduced demand leads to reduced hunting pressure

↓

Increasing small felid populations

**Goal 1.** General public widely informed on the value and importance of small felid survival.

**Goal 2.** General public does not buy or consume small felids, their parts or their derivatives.

- **Action:** Identify key audiences and the message that need to be deliver to those audiences regarding small felid conservation.
- **Action:** Use information on small felids to design and disseminate appropriate awareness materials (e.g. on small cat ecology- the role and importance of small felids in the ecosystem, laws protecting felids and other animals, etc) for various audiences to reduce trade and consumption of small felids, their parts and derivatives (authorities, students, hunters, traders, etc.)
- **Action:** Provide funding to develop and disseminate awareness materials.
- **Action:** Where needed, engage other international agencies at key sites to assist with small felid awareness programs.
- **Action:** Standardize methods to monitor and evaluate the effectiveness of the outreach methods.
- **Action:** Conduct pre and post surveys of audiences receiving outreach activities to determine change in awareness and behavior over time.
- **Responsible parties** for these actions will have to be determined in country through consultation with relevant organizations and authorities.
- **Measures of success:** Over time, evaluation of outreach campaigns should indicate and increase in awareness and change of behavior of the relevant audiences.



# Clouded Leopard and Small Felid Conservation Summit Final Report

## Section 3

### Sumatra Working Group Report



## Sumatra Working Group

*Members: Kuenzang Dorsi, Karma Gyamtsho, Iding A Haidir, Jennifer McCarthy, Wilson Novarino, Karmila Parakkasi, Dolly Priatna, Sunarto, Hariyo Tabah Wibisono*

### Data Assembly and Evaluation

The identification of the following habitat patches for Sumatra was based on National Parks, Tiger Conservation Landscapes, study sites of team members, and known forest cover.

1. Leuser, Ulu Masen, Singkil
2. Batang Toru
3. Batang Gadis, Rimbo Panti, Lembah Harau, Rimbang Baling
4. Senepis, Dumai
5. Giam Siak Kecil
6. Tesso Nilo
7. Kampar, Kerumutan,
8. Bukit Tiga Puluh
9. Taman Nasional Kerinci Seblat (TNKS), Batang Hari
10. Dangku, Harapan, Bukit 12
11. Berbak Sembilang
12. Bukit Barisan Selatan (BBS)
13. Way Kambas
14. Padang Sugihan (this area is highly degraded)

Density estimates: Clouded leopard density estimation was based on camera trap data from individual IDs from the southern Riau landscape.

Population trends: Trend in population size was based on the past 5 years. Several factors were considered to predict the trend, such as the trend of Sumatran tiger population, habitat loss and actual data (photo rate).

Future trends in K: Projected future trend in carrying capacity (K) was based on activities such as ecosystem restoration projects, implementation of a new conservation mechanism (carbon trading under the mechanism of Reduced Emission from Deforestation and Degradation – REDD), and logging moratoriums. However, in several areas the carrying capacity is still predicted to be decreasing in the future (due to the habitat loss).

Species present: The fishing cat is assumed to be absent from Sumatra. This assumption is based on examination of historical data and (genetic) studies of museum specimens. There have been some camera trap photos reported from the region, but all have subsequently been identified as leopard cat.

Population status: The following categories were used to classify the estimated population status of the felid species on Sumatra:

- Detected – Based on camera-trap data or direct observation of a specimen.
- Undetected – There was sufficient effort (camera trapping, live trapping) to detect the species, but it was not recorded.
- Unknown – Not detected, but there was insufficient effort for detection.
- Absent – Outside of historical range.

**POPULATION AND HABITAT DATA Per Habitat Patch**

**Region: Sumatra**

**Species: Clouded Leopard**

**Habitat type(s):**

<b>Parameter</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13*</b>	<b>14</b>
Population Status	Detected	Detected	Detected	Detected	Unknown	Detected	Detected	Detected	Detected	Detected	Detected	Detected	Unknown	Unknown
Most Recent Year of Detection and Responsible Organization	2004 Camera Trap (LMU)	2003 Camera Trap (Hatfield)	2006 Camera Trap (WWF)	2007 Live (WILMAR)		2008 Camera Trap (WWF)	2007 Camera Trap (WWF)	2007 Camera Trap (ZSL)	2008 Camera Trap (FFI/DICE/KSNP)	2006 Camera Trap (ZSL)	2008 Camera Trap (ZSL)	2006 Camera Trap (WCSIP)		
Trend in population size (stable / declining / increasing)	Declining	Declining	Declining	Declining		Declining	Declining	Declining	Stable	Declining	Stable	Increasing		
Reasons for absence/decline, if appropriate	Tsunami relief	Forest loss, hunting?	Forest loss	Forest conversion, illegal logging	Forest conversion	Encroachment, illegal logging	Forest conversion	Forest conversion		Encroachment, illegal logging				Forest loss
Projected future trend in carrying capacity (habitat area and/or quality)	Increase	Decrease	Decrease	Decrease	Decrease	Stable	Decrease	Decrease	Stable	Increase	Stable	Increase	Stable	Decrease
Current connectivity with other patches	No	No	No	No	No	No	No	No	No	No	No	No	No	No



Parameter	1	2	3	4	5	6	7	8	9	10	11	12	13*	14
Potential for future connectivity with other patches	No	2 - 3	3-6,3-8, 3-9	No	5-7	6-7	7-8		9-3, 9-8					
Projected future fragmentation / loss of connectivity	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

**POPULATION AND HABITAT DATA Per Habitat Patch**

**Region: Sumatra**

**Species: Flat-Headed Cat**

**Habitat type(s):**

<b>Parameter</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
Population Status	Undetected	Undetected	Undetected	Detected	Undetected	Undetected	Detected	Undetected	Undetected*	Undetected	Detected	Undetected	Detected	Unknown
Most Recent Year of Detection and Responsible Organization				2000 Camera Trap (PKHS)			2007 Road Kill (WWF received from Jim Sanderson)				1996 (Bezuizen, Oryx Vol 34 No.3)		1996 (Soemarso no, Press Release)	
Trend in population size (stable / declining / increasing)				Declining			Declining				Declining		Relatively stable?	
Reasons for absence/decline, if appropriate				Forest conversion , illegal logging			Forest conversion				Forest conversion, illegal logging		?	
Projected future trend in carrying capacity (habitat area and/or quality)				Decrease			Decrease				Decrease		?	
Current connectivity with other patches				No			No				No		No	

Parameter	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Potential for future connectivity with other patches				No			7-8				10		-	
Projected future fragmentation / loss of connectivity				Yes			Yes				Yes		No	

\* A deceased flat-headed cat was reported from this region, but there is much controversy about whether the specimen originated from the area. We have classified the species as undetected in this area.

**POPULATION AND HABITAT DATA Per Habitat Patch**

**Region: Sumatra**

**Species: Marbled Cat**

**Habitat type(s):**

<b>Parameter</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13*</b>	<b>14</b>
Population Status	Detected	Detected	Detected	Unknown	Unknown	Detected	Detected	Unknown	Detected	Detected	Unknown	Detected	Detected	Unknown
Most Recent Year of Detection and Responsible Organization	2004 Camera Trap (LMU)	2003 Camera Trap (Hatfield)	2006 Camera Trap (WWF)			2008 Camera Trap (WWF)	2007 Camera Trap (WWF)		2007 Camera Trap (FFI/DICE/KSNP)	2006 Camera Trap (ZSL)		2005 Camera Trap (WCSIP)	1996 (Ir. Dwiatmo Siswomartono)	
Trend in population size (stable / declining / increasing)	Declining	Declining	Declining		Declining	Declining	Declining	Declining	Stable	Declining		Increasing	?	
Reasons for absence/decline, if appropriate	Tsunami relief	Forest loss, hunting?	Forest loss	Forest conversion, illegal logging	Forest conversion	Encroachment, illegal logging	Forest conversion	Forest conversion		Encroachment, illegal logging		Increase	?	
Projected future trend in carrying capacity (habitat area and/or quality)	Increase	Decrease	Decrease	Decrease	Decrease	Stable	Decrease	Decrease	Stable	Increase	Stable	Increase	Stable	
Current connectivity with other patches	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Parameter	1	2	3	4	5	6	7	8	9	10	11	12	13*	14
Potential for future connectivity with other patches	No	2-3	3-6,3-8, 3-9	No	5-7	6-7	7-8		9-3, 9-8					
Projected future fragmentation / loss of connectivity	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

**POPULATION AND HABITAT DATA Per Habitat Patch**

**Region: Sumatra**  
**Species: Golden Cat**  
**Habitat type(s):**

<b>Parameter</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13*</b>	<b>14</b>
Population Status	Detected	Unknown	Detected	Undetected	Undetected	Undetected	Undetected	Detected	Detected	Detected	Unknown	Detected	Detected	Unknown
Most Recent Year of Detection and Responsible Organization	2004 Camera Trap (LMU)		2006 Camera Trap (WWF)					2007 Camera Trap (ZSL)	2007 Camera Trap (FFI/DICE/KSNP)	2006 Camera Trap (ZSL)		2008 Live (UMASS)		
Trend in population size (stable / declining / increasing)	Declining		Declining					Declining	Stable	Declining	Stable	Increasing	Stable	
Reasons for absence/decline, if appropriate	Tsunami relief	Forest loss, hunting?	Forest loss					Forest conversion		Encroachment, illegal logging				
Projected future trend in carrying capacity (habitat area and/or quality)	Increase	Decrease	Decrease					Decrease	Stable	Increase	Stable	Increase	Stable	
Current connectivity with other patches	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Parameter	1	2	3	4	5	6	7	8	9	10	11	12	13*	14
Potential for future connectivity with other patches	No	2-3	3-6,3-8, 3-9	No	5-7	6-7	7-8		9-3, 9-8					
Projected future fragmentation / loss of connectivity	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

**POPULATION AND HABITAT DATA Per Habitat Patch**

**Region: Sumatra**

**Species: Leopard Cat**

**Habitat type(s):**

<b>Parameter</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13*</b>	<b>14</b>
Population Status	Detected	Unknown	Detected	Detected	Unknown	Detected	Detected	Unknown	Detected	Detected	Unknown	Detected	Unknown	Unknown
Most Recent Year of Detection and Responsible Organization	2004 Camera Trap (LMU)		2006 Camera Trap (WWF)	2004 Live		2008 Camera Trap (WWF)	2007 Camera Trap (WWF)		2008 Live (FFI/DICE/ KSNP)	2008 Live (ZSL)		2004 Camera Trap (WCSIP)		
Trend in population size (stable / declining / increasing)	Increasing		Increasing	Increasing		Increasing	Increasing	Increasing	Increasing	Increasing		Stable		
Reasons for absence/decline, if appropriate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Projected future trend in carrying capacity (habitat area and/or quality)	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing
Current connectivity with other patches	Better	Better	Better	Better	Better	Better	Better	Better	Better	Better	Better	Better	Better	Better
Potential for future connectivity with other	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



Parameter	1	2	3	4	5	6	7	8	9	10	11	12	13*	14
patches														
Projected future fragmentation / loss of connectivity	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely	Very unlikely

\* There is extensive, long-term camera trapping data for this area, but we do not have access to these data at this point.

## Identification and Prioritization of Key Issues Affecting Felids in Sumatra

The working group brainstormed to create the following list of issues affecting felids in Sumatra:

1. Competition with Other Carnivores  
We agree that there is competition among clouded leopards, golden cats and tigers. In many areas with a high number of tiger signs, there is a lower amount of medium-sized cat signs. We are debating, though, whether the species have successfully been spatially arranged if this should be considered competition, as it is difficult to tell whether competition with other felids is causing a decline for the species.
2. Direct Illegal Hunting  
In most cases there is no evidence of direct hunting; rather it seems to be incidental. The exception is Habitat Patch 9, where there has been evidence of directed hunting of clouded leopards.
3. Disease  
This is unknown in all areas, although there has been some evidence of rabies outbreaks among domestic animals in North Sumatra, and there is some interest from veterinarians on whether this is affecting wild felids.
4. Habitat Degradation  
This is an overriding issue for all patches.
5. Habitat Destruction and Conversion  
The type of conversion is different in different areas. In Patch 1 there are oil palm plantations and village construction. In Patch 12 conversion is mostly agricultural (cocoa and coffee). Palm oil plantations are the overriding type of conversion across Sumatra.
6. Hunting of Clouded Leopard Prey  
Present in all areas.
7. Indirect Hunting of Clouded Leopards  
Present in all areas, as there is poaching of prey and cats may be accidentally snared.
8. Lack of Enforcement  
There are a lot of rangers, but there is ineffective deployment and actual enforcement. Patches 12, 9, and 13 are better enforced than other areas but poaching still occurs.
9. Resource Exploitation  
Present in all areas.
10. Trade  
We believe that trade probably affects all areas.
11. Lack of Ecological Knowledge  
There is an overriding lack of knowledge for this species (clouded leopards) in Sumatra, such as how the species exists with tigers and other cat species, and what habitat the species uses. This makes it difficult to know for sure what issues affect the species.

12. Lack of Education

There is a lack of education among local people about these species. Many people report conflicts with tigers, but in reality the conflict is sometimes caused by clouded leopards, or sun bears.

13. Inadequate Capacity of Staff

There was some discussion about whether to label this issue as inadequate staff, or corruption. This is a definite issue in all areas.

14. Global Demand for Natural Resources

There is a very high global demand for natural resources such as palm oil, and pulp and paper, and this has a very detrimental effect on the habitat in Sumatra.

15. Low Priority of Conservation Agenda

There is a low priority for conservation in the country and so there is a lack of money and support for conservation studies.

16. Decentralization

17. Low Prioritization of Small Cat Studies

There has been a large focus on tigers in the region, but small felid species have been largely ignored. Even when data are collected, there has been little dissemination of these data. This is in part due to funding and in part due to government priorities.

18. Lack of Collaboration Among Agencies

Some government agencies are working to protect the national parks, while others are selling off the forests.

19. Need for Scientific-Based Management and Priority Setting

The following table identifies which of these issues affect each of the 14 identified habitat patches (U = unknown; NA = not applicable).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Competition with other carnivores	x	x	x	x	x	x	x	x	x	x	x	x	x	NA
Direct illegal hunting	U	U	U	U	U	U	U	U	X	U	U	U	U	U
Disease	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Habitat degradation	X	x	x	x	x	x	x	x	x	x	x	x	x	NA
Habitat destruction and conversion	X	x	x	x	x	x	x	x	x	x	x	x	x	X
Hunting of felid prey	X	x	x	x	x	x	x	x	x	x	x	x	x	NA
Indirect hunting of felids	X	x	x	x	x	x	x	x	x	x	x	x	x	NA
Lack of enforcement	X	x	x	x	x	x	x	x	NA	x	x	NA	NA	X
Resource exploitation	X	x	x	x	x	x	x	x	x	x	x	x	x	X

Trade	U	U	U	U	U	U	U	U	U	U	U	U	U	U	NA
Lack of ecological knowledge	X	x	x	x	x	x	x	x	x	x	x	x	x	x	NA
Lack of education	x	x	x	x	x	x	x	x	x	x	x	x	x	x	X
Inadequate capacity of staff	x	X	x	x	x	x	x	x	x	x	x	x	x	x	X
Global demand for natural resources	x	X	x	x	x	x	x	x	x	x	x	x	x	x	X
Low priority of conservation agenda	x	X	x	x	x	x	x	x	x	x	x	x	x	x	X
Decentralization	x	X	x	x	x	x	x	x	x	x	x	x	x	x	X
Low prioritization of small cat studies	x	X	x	x	x	x	x	x	x	x	x	x	x	x	X
Lack of collaboration among agencies	x	X	x	x	x	x	x	x	x	x	x	x	x	x	X
Need for scientific-based management / priorities	x	X	x	x	x	x	x	x	x	x	x	x	x	x	X

Habitat degradation, destruction and conversion were combined into one issue, and the resulting list of 18 issues was prioritized by the working group members (using the sticky dot method, with 3 dots per person per criterion) with respect to two separate criteria: 1) highest conservation concern; and 2) possible for group members (as researchers/educators) to impact. The resulting top priority issues were:

Issue	Conservation concern (# dots)	Ability to impact (# dots)
Habitat degradation / destruction	7	0
Education / awareness	5	6
Lack of enforcement	5	3
Lack of ecological knowledge	2	6
Low priority of conservation agenda	2	0
Science-based management / priority setting	0	3

## Identification of Goals and Recommended Actions

Issue statements, goals and recommended actions were developed for the top three issues (i.e., those that were identified as priorities on both criteria).

### 1. Lack of Education and Awareness

There is a lack of education among local people about these species.

#### ISSUES:

- Conservation effort is less effective without support from key stakeholders.
- Stakeholders will not support felid conservation without knowing the conservation value of the species.

GOAL: To improve knowledge, attitude, and behavior of key stakeholders toward felid conservation.

### 2. Lack of Law Enforcement

There are a lot of rangers, but there is ineffective deployment and actual enforcement.

#### ISSUE:

- Illegal logging, encroachment, hunting, and poaching are all problems, and lead to forest degradation and destruction, which negatively affect the availability of habitat for felids.

GOAL: To strengthen law enforcement to prevent future forest degradation / destruction.

### 3. Lack of Ecological Knowledge

There is an overriding lack of scientific information for these species in Sumatra, such as how the species exist with tigers and each other, and what habitat the species use. This makes it difficult to know for sure what issues affect these species.

#### ISSUE:

- Without having good data on population status and ecology it is difficult to implement effective conservation initiatives.

GOAL: To initiate studies to improve knowledge on felid population status and ecology.

<b>Goal</b>	<b>Action</b>	<b>Output Indicator</b>	<b>Timeframe</b>	<b>Responsibilities</b>
Improve knowledge and awareness to change the behavior of key stakeholders	Conduct knowledge, attitude and behavior survey at selected sites (BBS, KSL, BTP, Tesso Nilo)	Surveys conducted	2008 - 2010	Jenni (UMASS), Beebach (WCS), Dolly (ZSL), Iding (FFI), Karmila and Sunarto (WWF), Wilson (UNAND), PHKA
	Campaign for wild cat conservation through workshops, conservation education, sustainable ecotourism	Series of workshops conducted	2010-2011	
		Conservation education / school visits conducted		
		Felid ecotourism conducted in selected areas		
	Dissemination of survey reports to the stakeholders	The results of survey disseminated to build a recommendation in terms of developing small cat conservation action	2011	
Strengthen law enforcement to prevent future habitat degradation / destruction	Fundraise to strengthen the existing Wildlife Protection Units (increase activity and add more units)	Funds available to maintain existing WPU	Yearly basis with incremental increase of government funding	Beebach (WCS), Sunarto and Karmila (WWF), Iding (FFI), PA Authority
	Create new ones in strategic sites	Add more units in KSNP, BBS, Riau		
	Include small felids as a law enforcement target	Networking between WPU established		
	Assist and monitor the law enforcement efforts	Small felids included as target in KSNP, Riau, North Sumatra, Lampung		
		Number of sentenced cases increased (first data point will be collected)		
		Database on law enforcement integrated		

Goal	Action	Output Indicator	Timeframe	Responsibilities
		Official reports of law enforcement developed		
	Conduct integrated investigation of illegal trade of wild felids throughout Sumatra	Reports on illegal trade of wild felids Investigation networking among relevant partners established	2010	Beebach (WCS), Sunarto and Karmila (WWF), Iding (FFI), PHKA
Initiate studies to improve knowledge on population status, distribution and ecology	Identify common and robust methodology for investigating population status, ecology and threats	Series of three focus group discussions conducted	2010	Jenni (UMASS), Beebach (WCS), Dolly (ZSL), Iding (FFI), Karmila and Sunarto (WWF), Wilson (UNAND), PHKA
		Commonly agreed survey protocol established	2010	
		Survey protocol tested and revised if necessary	2010	
		Survey on wild felid population status, ecology and threats conducted (presence / absence survey at areas with unknown status, population surveys at areas with known status)	2008-2012	
		Report on wild cats' population status, ecology and threats	2013	





# Clouded Leopard and Small Felid Conservation Summit Final Report

## Section 4 Borneo Working Group Report



## BORNEO WORKING GROUP REPORT

*Members: Raymond Alfred, Jedediah Brodie, Susan Cheyne, Anthony Giordano, Andrew Hearn, Karen Povey, Rajanathan Rajaratnam, Joanna Ross, Rustam, Azri Sawang, Ben Warren, Andreas Wilting*

### Data Assembly and Evaluation

The working group was tasked with assessing clouded leopard and small felid distribution across the island of Borneo.

#### Group statement – all cats

In any logged area, threats to all cats may include:

- Disease in areas where there are feral cats and dogs
- Vehicle collisions (logging roads etc)
- Cats being killed by feral dogs
- Competition between cats and packs of feral dogs hunting for prey.

#### Group statement - Leopard cats

- Facing same threats as other felids, but currently have a wider geographical distribution
- They appear to do well in disturbed forest, but persistence in palm oil plantations is unclear
- Possible threat of hybridization with feral cats – Andreas Wilting: perhaps not too much of a threat in the wild
- Leopard cats are present in all of our focal areas, but probably at higher density

#### Clouded Leopards

Sunda (Sundaland) Clouded Leopard (*Neofelis diardi*)

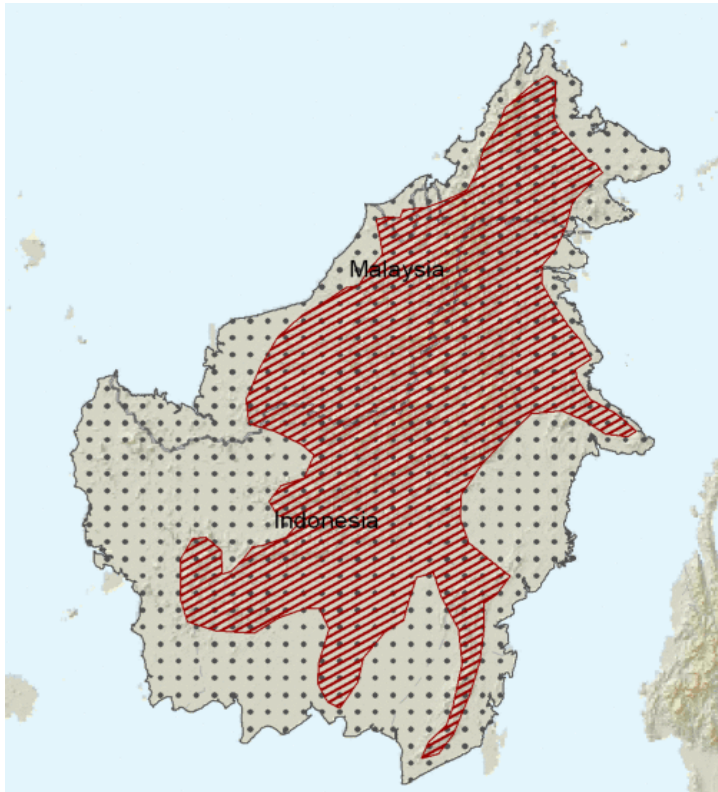
IUCN Red List Status (2008): vulnerable

Subspecies Bornean Clouded Leopard (*Neofelis diardi borneensis*)

IUCN Red List Status (2008): endangered

#### RANGE

Indonesian Borneo, Malaysian Borneo and Brunei, 2008 (IUCN Red List 2008)



Clouded leopards have been recorded from the following habitat types:

- peat-swamp forest
- dipterocarp forest (lowland and montane)
- mangrove forest
- selectively logged dipterocarp forest (lowland and montane)

Sites in Indonesian Borneo where clouded leopards have been confirmed:

- Sebangau National Park, Kalimantan Tengah
- Bukit Baka Bukit Raya National Park, Kalimantan Tengah/Kalimantan Barat
- Gunung Palung National Park, Kalimantan Barat
- Flora and Fauna International Area (surrounding GP), Kalimantan Barat bar
- Kelian Protection Forest, Kalimantan Timur
- Sungai Wain, Kalimantan Timur
- Bukit Soeharto, Kalimantan Timur
- Batu Beruk, Kalimantanatn Timur
- Wehea Protection Forest, Kalimantan Timur

Population estimate for sites in Indonesian Borneo

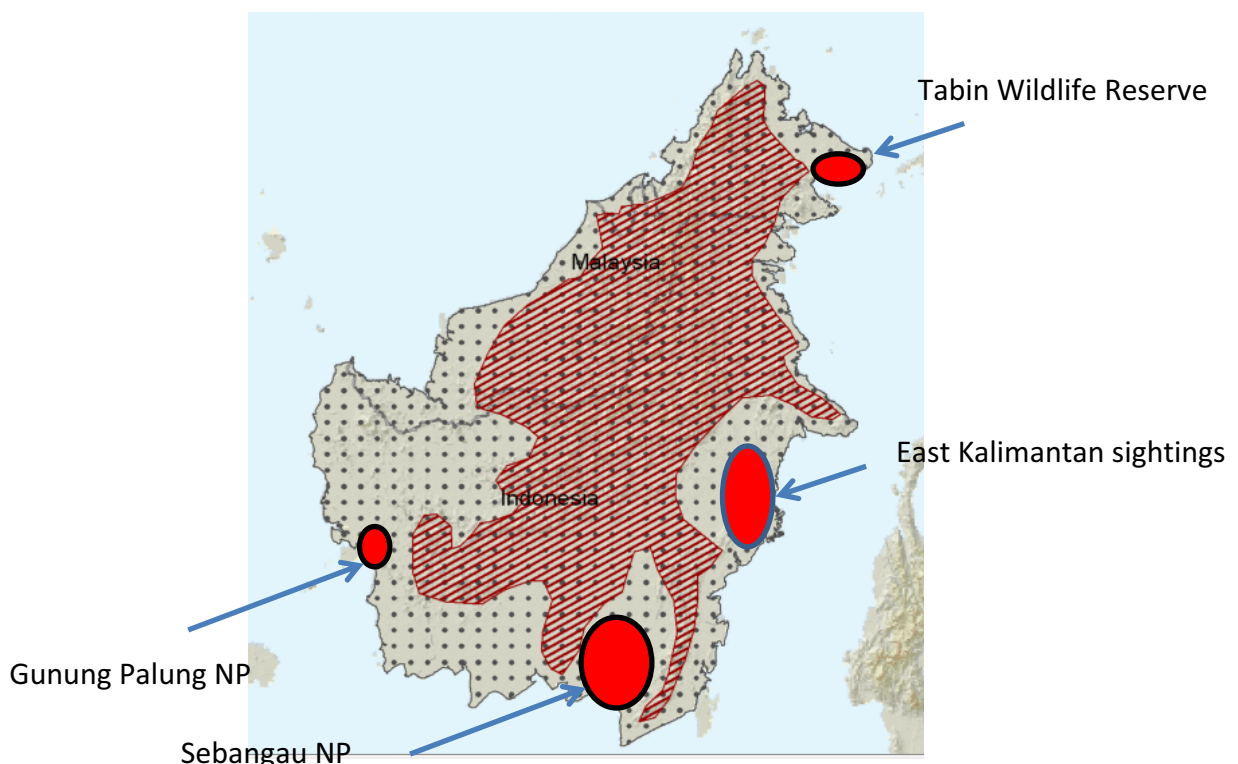
- DATA DEFICIENT FOR ALL AREAS!
- More studies needed.

Sites in Malaysian Borneo where clouded leopards have been confirmed

- Tabin Wildlife Reserve/Kulamba
- Lower Kinabatangan River Region
- Upper Kinabatangan and Segama Forest Landscape (including Malua F.R and Danum Valley Conservation Area)
- Sapulut Forest Reserve
- Ulu Tungud Forest Reserve
- Trus Madi Forest Reserve
- Crocker Range National Park
- Lanjak Entimau, Batang Air (Sarawak)/ Bentung Kerihun (Kalimantan)
- Maludam
- Samunsam/ Tanjung Dato
- Palung Tau National Park
- Lambir Hills National Park
- Tangkulap/Deramakot/Segaliud Lokan
- Ulu Kalumpang
- Gunung Mulu

2009 ESTIMATES BASED ON DATA FROM THIS MEETING

Additional data are now available and we are to update the range map as follows:



Patches in BRUNEI where clouded leopards have been confirmed

- Ulu Temburong - only site

Data deficient country

### Other Small Felids

Bay cat, flat-headed cat, marbled cat and leopard cat

All are present in the following areas (including clouded leopard):

Malaysia - confirmed

- Danum Valley Region
- Deramakot Area

Indonesia - confirmed

- Sungai Wain
- Gunung Palung

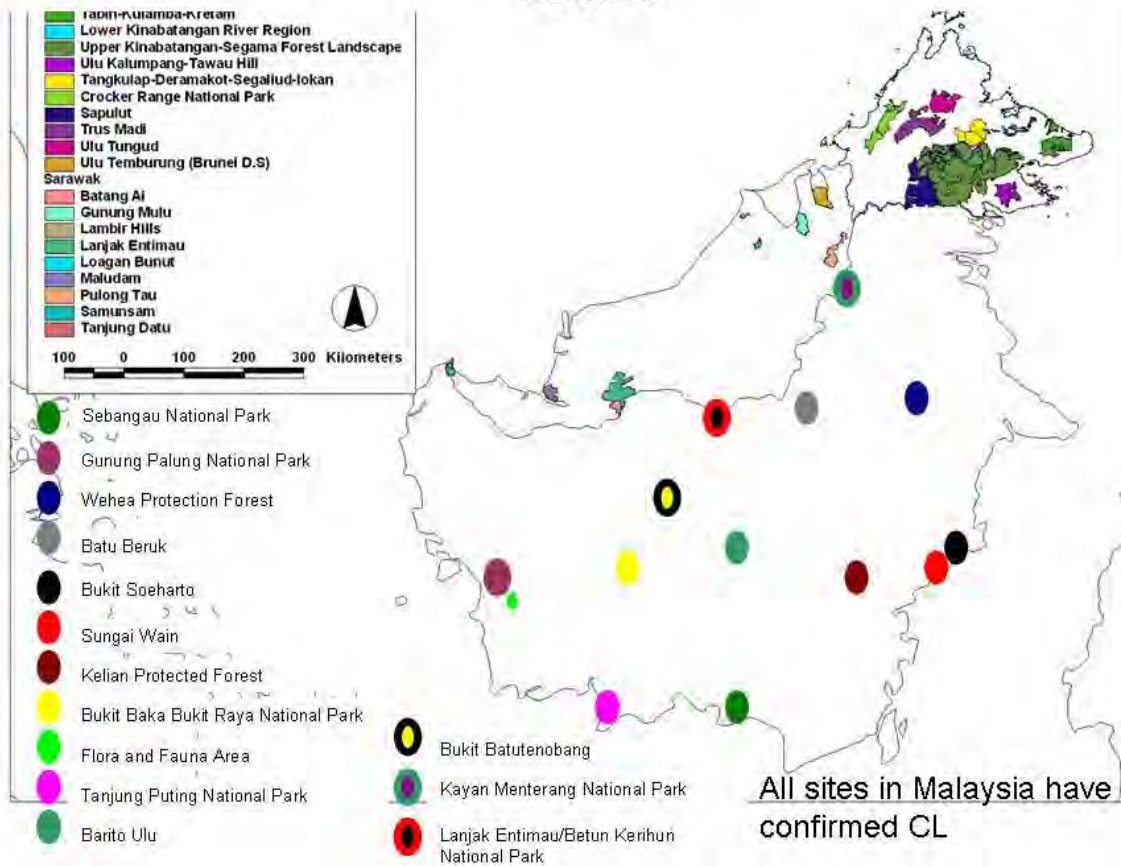
### **CONCLUSIONS**

- More data are needed on the biology and ecology of clouded leopards and all small felids in Borneo.
- Flat-headed cats are associated predominantly with riverine/wetland habitat which reduces their potential distribution.
- Bay cats have historically been recorded as rare and today seem to occur at relatively low density, even in pristine habitat
- All small felids have been recorded from primary forest and also selectively logged forest; however, their use of oil palm plantations is unknown

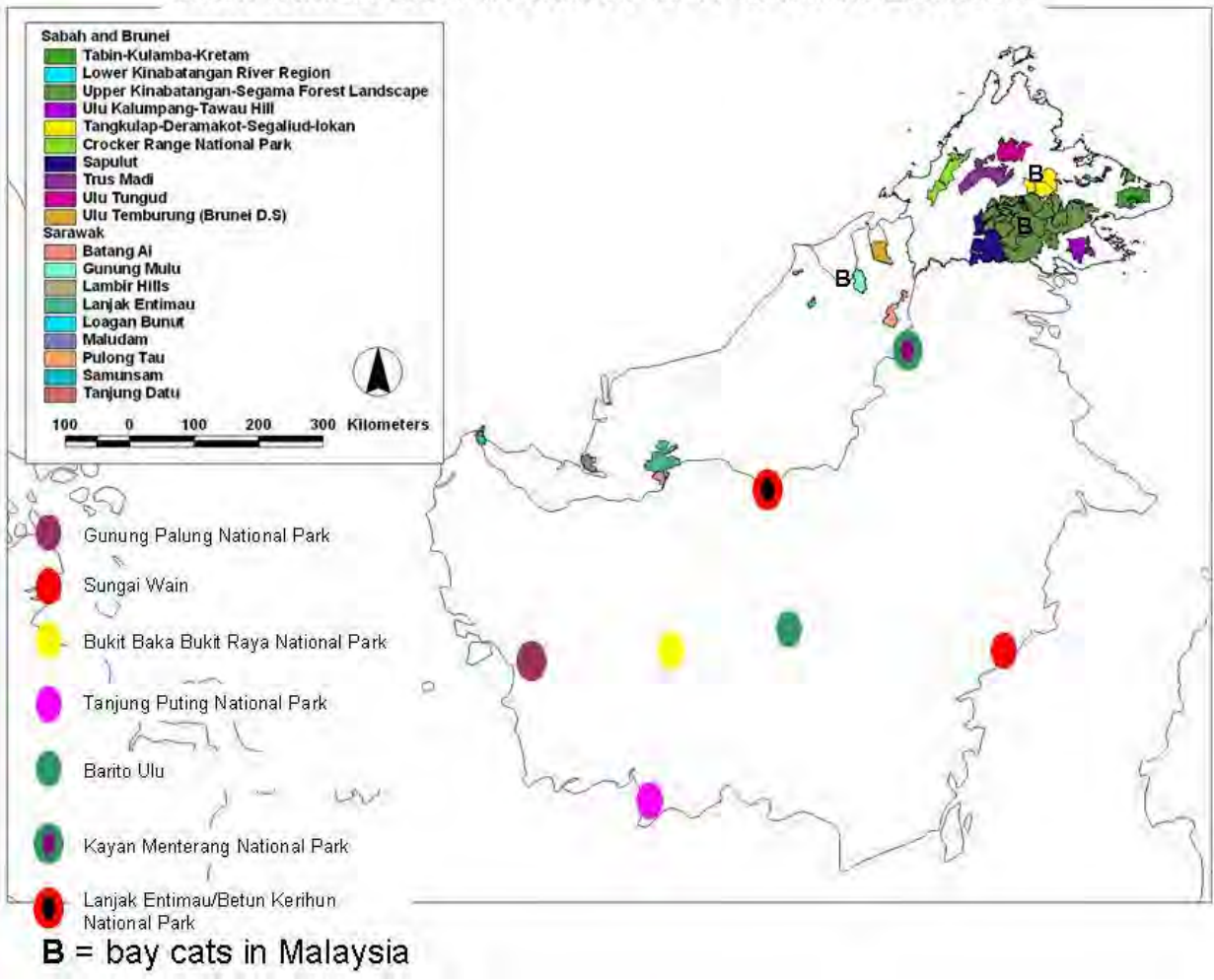
**Map of current sightings/records of clouded leopards and small felids in Borneo based on data no more than 10 years old and new data presented at this workshop.**

Note: Malaysian areas are accurate shape files.  
Indonesian areas are **not** to scale and indicate location only.

**CONFIRMED LOCATIONS OF CLOUDED LEOPARDS AND LEOPARD CATS IN BORNEO**

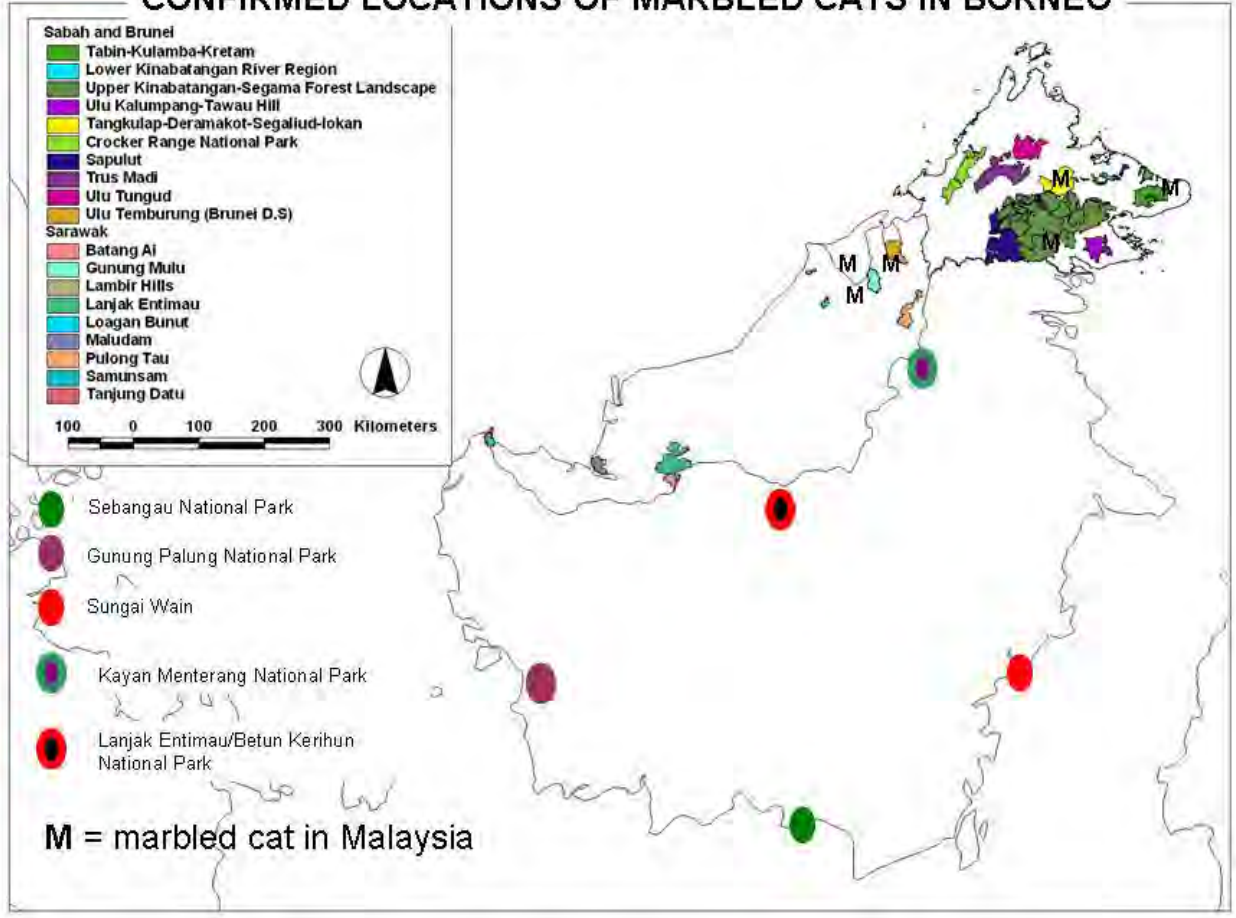


## CONFIRMED LOCATIONS OF BAY CATS IN BORNEO

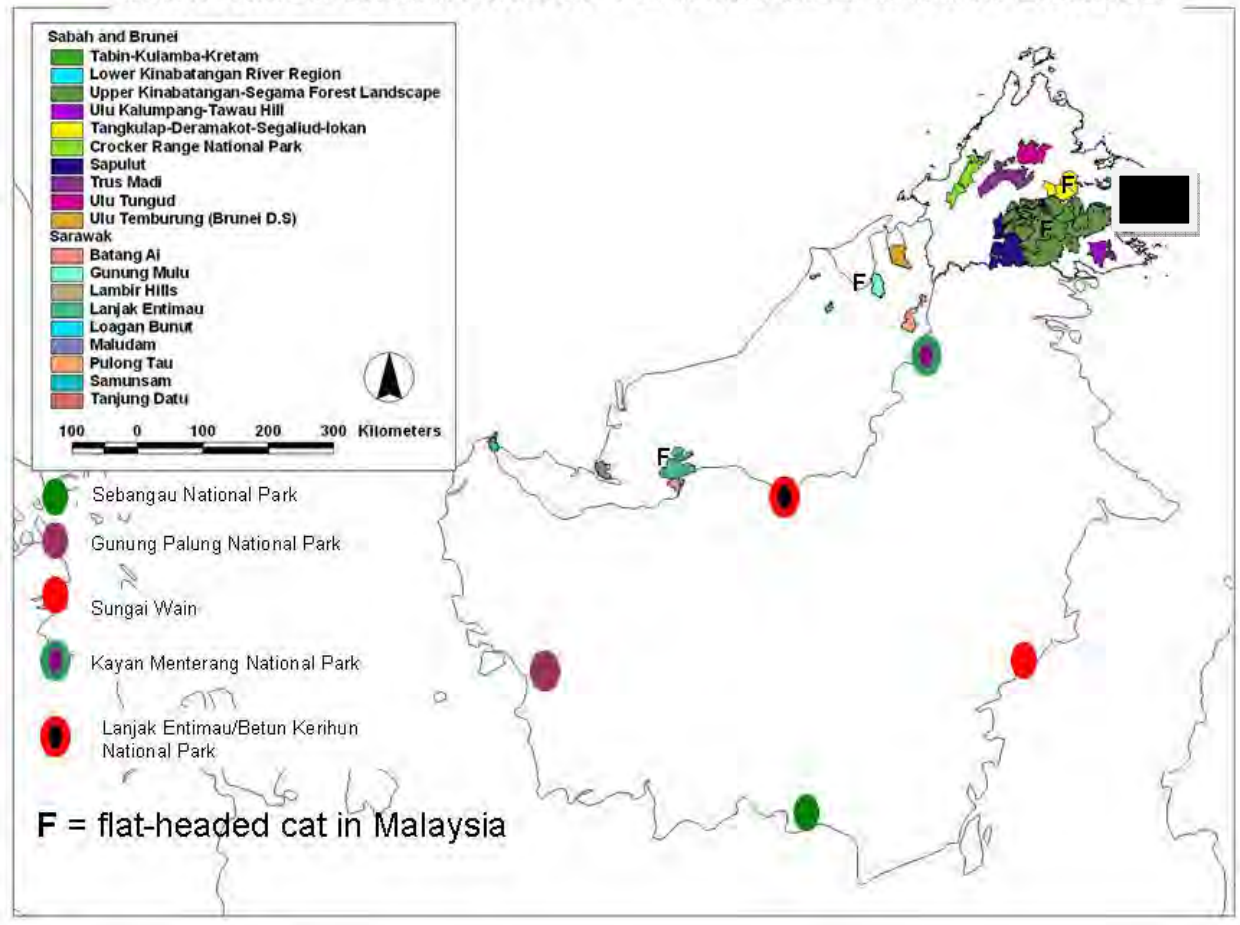




## CONFIRMED LOCATIONS OF MARBLED CATS IN BORNEO



## CONFIRMED LOCATIONS OF FLAT-HEADED CATS IN BORNEO



**Note:** Flat-headed cats are confirmed in Tabin WR

## TABLES AND PATCHES FOR DISTRIBUTION OF BORNEAN FELIDS

**Region: Indonesian Borneo**

**Species: Clouded leopards**

**Habitat type(s): Peat-swamp forest, dipterocarp forest (lowland and montane), mangrove forest, selectively logged dipterocarp forest (lowland and montane)**

Parameter	Patch 1	Patch 2	Patch 3	Patch 4
Site Name	Sebangau National Park, Kalteng	Bukit Baka Bukit Raya National Park, Kalteng/KalKalbar	Gunung Palung National Park, Kalbar	Flora and Fauna International Area (surrounding GP), Kalbar
Presence/absence of species	Detected (2008)	Detected (2003?)	Detected (2008)	Unknown
Conservation value	High (largest known population in peat swamp)	Insufficient data	High (good protection, remote difficult access)	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Trend in population size (stable/declining/increasing)				
Current threats	Fire, illegal logging	Illegal logging, conversion to plantation (oil palm and acacia)	Indirect hunting	Habitat destruction (logging of primary forest)
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches			Flora and Fauna Reserve	
Potential for future connectivity with other patches	None (surrounded by rivers and sea)		Possible	
Projected future fragmentation / loss of connectivity	Possible			

Parameter	Patch 5	Patch 6	Patch 7	Patch 8
Site Name	Kelian Protection Forest, Kaitim Sighting (camera trap photo) S 00 03' 29.5"	Sungai Wain, Kaitim	Bukit Soeharto, Kaitim	Batu Beruk, Kaitim
Presence/absence of species	Detected (2008)	Detected (2007)	Detected (2007)	Detected (2008)
Conservation value	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)				
Trend in population size (stable/declining/increasing)				
Current threats	Direct hunting, illegal logging	illegal logging	Illegal logging, coal mining, fire	Legal logging
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches	None	None	None	None
Potential for future connectivity with other patches	None	None	Yes	Yes
Projected future fragmentation / loss of connectivity	Yes, palm oil	Yes, palm oil	No	Yes

Parameter	Patch 9	Patch 10	Patch 11	Patch 12
Site Name	Wehea Protection Forest, Kaltim	Tanjung Puting		
Presence/absence of species	Detected (2008)	Detected (2004?)		
Conservation value	Insufficient data	Insufficient data		
Relative abundance	Insufficient data	Insufficient data		
Trend in population size (stable/ declining/increasing)				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Current threats	Illegal logging	Illegal logging, plantations		
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches	None	None		
Potential for future connectivity with other patches	None	None		
Projected future fragmentation / loss of connectivity		Yes (see current threats)		

**Region: Malaysian Borneo  
Species: Clouded leopards**

**Habitat type(s): Dipterocarp forest (lowland and montane), mangrove forest, selectively logged dipterocarp forest (lowland and montane)**

Parameter	Patch 1	Patch 2	Patch 3	Patch 4
Site Name	Tabin Wildlife Reserve/Kulamba	Lower Kinabatangan River Region	Upper Kinabatangan and Segama Forest Landscape (inc Malua F.R and Danum)	Sapulut Forest Reserve
Presence/absence of species	Detected (2008)	Detected (2008)	Detected (2008)	Detected (2002)
Conservation value	Medium (isolated, but potentially large population)	Low (too fragmented and small)	High (large forest complex with at least one high density population)	Low (60 % converted to industrial tree plantation (ITP))
Relative abundance	Medium/High (a high density at the western border of the reserve, but for the rest no data is available)	Insufficient data	Medium (over the total area, some parts have a high density, whereas other forest reserves in the area have a low density)	Insufficient data
Current threats	Prey depletion through hunting for bushmeat, accidental hunting (hunters targeting other species)	Oil palm, illegal selective logging, pollution (plantation run-off)	Prey depletion through hunting for bushmeat, accidental hunting (hunters targeting other species), habitat degradation, conversion to oil palm	Habitat degradation, Prey depletion through hunting for bushmeat
Trend in population size (stable/declining/increasing)	Probably stable, because the whole area is declared as a wildlife Reserve under total protection	Decline	Declining	Declining
Reasons for absence/decline, if appropriate		Oil palm	See current threats	See current threats
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)		Stable	Declining	Declining
Current connectivity with other patches	None	No	Yes (Tangkulap/Derama-kot/Segaliud Lokan if the clouded leopards will cross the Kinabatangan river)	No
Potential for future connectivity with other patches	Potential (with Kinabatangan)	Yes (Kulamba)	No	Potential (Upper Kinabatangan and Segama Forest Landscape (inc Malua

Parameter	Patch 1	Patch 2	Patch 3	Patch 4
				F.R and Danum))
Projected future fragmentation / loss of connectivity		None (area gazette by law)		National Tree plantation

Parameter	Patch 5	Patch 6	Patch 7	Patch 8
Site Name	Ulu Tungud Forest Reserve	Trus Madi Forest Reserve	Crocker Range National Park	Lanjak Entimau, Batang Air (Sarawak)/ Bentung Kerihun (Kalimantan)
Presence/absence of species	Detected (2002)	Detected (2002)	Detected (2002)	Detected (2008)
Conservation value	Low (poor and isolated forest)	Low (isolated, and poor forest condition)	Insufficient data	High (large forest complex, trans-border reserve)
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Trend in population size (stable/ declining/increasing)	declining	declining		
Current threats	Poor forest and indirect hunting	Legal logging	Indirect hunting	Illegal logging, indirect hunting, oil palm plantations
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation (based on K-values)				
Projected future trend in carrying capacity (habitat area and/or quality)	declining	declining		
Current connectivity with other patches	No	No	No	Yes (Kayan Menterang)
Potential for future connectivity with other patches	No	Potential (Ulu Sungai Millian)	No	Potential (Gunung Palung)
Projected future fragmentation / loss of connectivity	Already fragmented and isolated	Already fragmented and isolated		

Parameter	Patch 9	Patch 10	Patch 11	Patch 12
Site Name	Maludam	Samunsam/ Tanjung Dato	Palung Tau National Park	Lambir Hills National Park
Presence/absence of species	Unknown	Detected (1992)	Unknown	Detected (2004 – Raffles Bulletin of Zoology Azlan & Lading)
Conservation value	Insufficient data	Insufficient data	Insufficient data	Low (isolated and heavily hunted)
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Trend in population size (stable/ declining/increasing)				
Current threats	Indirect hunting, illegal logging	Indirect hunting, illegal logging	Indirect hunting	Indirect hunting
Reasons for absence/decline, if appropriate				Fragmented, small population
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				Decline
Current connectivity with other patches	No	Yes, connected to Kayan Menterang	No	No
Potential for future connectivity with other patches	No	No	Potential (Kayan Menterang)	No, too isolated
Projected future fragmentation / loss of connectivity				



Parameter	Patch 13	Patch 14	Patch 15	Patch 16
Site Name	Tangkulap/Deramakot/Segaliud Lokan	Ulu Kalumpang	Gunung Mulu	
Presence/absence of species	Detected (2008)	Detected (2002)	Unknown	
Conservation value	High (connected to the Upper Kinabatangan and Segama forest landscape)	Insufficient data	High (large forest complex)	
Relative abundance	Low (based on first data from Deramakot)	Insufficient data	Insufficient data	
Trend in population size (stable/declining/increasing)	Probably stable	Declining	Probably declining	
Current threats	Legal selective logging, indirect hunting (Tangkulap only)	Illegal encroachment and indirect hunting	Indirect hunting	
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)		Declining		
Current connectivity with other patches	Yes (Upper Kinabatangan if the clouded leopards will cross the Kinabatangan river)	No	Probably to Limbe in Sarawak	
Potential for future connectivity with other patches	Potential (Yes (Lower Kinabatangan)	No	Potential to Pulong Tau and Ulu Temburong	
Projected future fragmentation / loss of connectivity				

**Region: Brunei**  
**Species: Clouded leopards**  
**Habitat type(s): Pristine lowland dipterocarp**

Parameter	Patch 1
Site Name	Ulu Temburong
Presence/absence of species	Detected (Data from Universiti Brunei)
Conservation value	High (large and ?pristine? forest complex)
Relative abundance	Insufficient data
Estimated population size (or estimated range)	
Trend in population size (stable/declining/increasing)	
Current threats	Indirect hunting
Reasons for absence/decline, if appropriate	
Estimated carrying capacity / habitat saturation	
Projected future trend in carrying capacity (habitat area and/or quality)	
Current connectivity with other patches	Probably to Limbe in Sarawak
Potential for future connectivity with other patches	Potential to Pulong Tau and Gunung Mulu
Projected future fragmentation / loss of connectivity	

We recognize that water pollution especially illegal gold mining (mercury poisoning) and over-fishing, habitat conversion (lack of buffers along rivers) will be threats to flat-headed cats throughout their range.

**Region: Indonesian Borneo**

**Species: Flat-headed cat**

**Habitat type(s): Peat-swamp forest, pristine dipterocarp forest (lowland and montane), mangrove forest, selectively logged dipterocarp forest (lowland and montane)**

**All areas, where FHC were detected are classified as high conservation value!!**

Parameter	Patch 1	Patch 2	Patch 3	Patch 4
Site Name	Sebangau National Park, Kalteng	Bukit Baka Bukit Raya National Park, Kalteng/KalKalbar	Gunung Palung National Park, Kalbar	Flora and Fauna International Area (surrounding GP), Kalbar
Presence/absence of species	Detected (2006)	Unknown	Unknown	Unknown
Conservation value	High (largest peat swamp area)	Insufficient data	Insufficient data	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Trend in population size (stable/declining/increasing)				
Current threats	Fire, illegal logging		Indirect hunting	
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches			Flora and Fauna Reserve	
Potential for future connectivity with other patches	None (surrounded by rivers and sea)		Possible	
Projected future fragmentation / loss of connectivity	Possible			

Parameter	Patch 5	Patch 6	Patch 7	Patch 8
Site Name	Kelian Protection Forest, Kaltim Sighting (camera trap photo) S 00 03' 29.5"	Sungai Wain, Kaltim	Bukit Soeharto, Kaltim	Batu Beruk, Kaltim
Presence/absence of species	Unknown	Detected (2005 Cat News 47)	Unknown	Unknown
Conservation value	Insufficient data	High (one of the few areas with confirmed FHC)	Insufficient data	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Trend in population size (stable/declining/increasing)				
Current threats				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches		None		
Potential for future connectivity with other patches		None		
Projected future fragmentation / loss of connectivity		Yes, palm oil		

Parameter	Patch 9	Patch 10	Patch 11	Patch 12
Site Name	Wehea Protection Forest, Kaltim	Tanjung Putting	Barito Ulu	
Presence/absence of species	Unknown	Unknown	Unknown	
Conservation value	Insufficient data	Insufficient data	Insufficient data	
Relative abundance	Insufficient data	Insufficient data	Insufficient data	
Trend in population size (stable/ declining/increasing)				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Current threats				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches		None		
Potential for future connectivity with other patches		None		
Projected future fragmentation / loss of connectivity		Yes (see current threats)		

Parameter	Patch 1	Patch 2	Patch 3	Patch 4
Site Name	Tabin Wildlife Reserve/Kulamba	Lower Kinabatangan River Region	Upper Kinabatangan and Segama Forest Landscape (inc Malua F.R and Danum)	Sapulut Forest Reserve
Presence/absence of species	Detected (2002 Cat News 47)	Detected (2008)	Detected (2008)	Unknown
Conservation value	High	High	High	Low (large areas are already converted)
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Current threats				
Trend in population size (stable/declining/increasing)				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches		No	Yes (Tangkulap/Deramak of/Segaliud Lokan if the flat-headed cats will cross the Kinabatangan river)	
Potential for future connectivity with other patches		Yes (Kulamba)	No	
Projected future fragmentation / loss of connectivity		None (area gazette by law)		

Parameter	Patch 5	Patch 6	Patch 7	Patch 8
Site Name	Ulu Tungud Forest Reserve	Trus Madi Forest Reserve	Crocker Range National Park	Lanjak Entimau, Batang Ai (Sarawak)/ Bentung Kerihun (Kalimantan)
Presence/absence of species	Unknown	Unknown	Unknown	Unknown
Conservation value	Insufficient data	Insufficient data	Low (maybe to high altitudes)	High (because of a large forest complex with suitable habitat)
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Trend in population size (stable/declining/increasing)				
Current threats				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation (based on K-values)				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches				Yes (Kayan Menterang)
Potential for future connectivity with other patches				Potential (Gunung Palung)
Projected future fragmentation / loss of connectivity				

Parameter	Patch 9	Patch 10	Patch 11	Patch 12
Site Name	Maludam	Samunsam/ Tanjung Dato	Palung Tau National Park	Lambir Hills National Park
Presence/absence of species	Unknown	Unknown	Unknown	Unknown
Conservation value	Insufficient data	Insufficient data	High (large area, only PA in the north of Sarawak)	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Trend in population size (stable/ declining/increasing)				
Current threats				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches				
Potential for future connectivity with other patches				
Projected future fragmentation / loss of connectivity				



Parameter	Patch 13	Patch 14	Patch 15	Patch 16
Site Name	Tangkulap/Deramakot/Segaliud Lokan	Ulu Kalumpang	Gunung Mulu	Loagan Bunut
Presence/absence of species	Detected (2009)	Unknown	Unknown	Detected (Reports from Sarawak Forest Dept.)
Conservation value	High	Medium (encroached by Iban, but good forest along a river system)	Insufficient data	High
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)				
Trend in population size (stable/declining/increasing)				
Current threats	Legal selective logging, indirect hunting (Tangkulap only)			
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches	Yes (Upper Kinabatangan if flat-headed cats will cross the Kinabatangan river)			No
Potential for future connectivity with other patches	Potential Lower Kinabatangan			No
Projected future fragmentation / loss of connectivity				

**Region: Brunei**  
**Species: Flat-headed cat**  
**Habitat type(s): Pristine lowland dipterocarp**

Parameter	Patch 1
Site Name	Ulu Temburong
Presence/absence of species	Unknown
Conservation value	Insufficient data
Relative abundance	Insufficient data
Estimated population size (or estimated range)	
Trend in population size (stable/declining/increasing)	
Current threats	
Reasons for absence/decline, if appropriate	
Estimated carrying capacity / habitat saturation	
Projected future trend in carrying capacity (habitat area and/or quality)	
Current connectivity with other patches	
Potential for future connectivity with other patches	
Projected future fragmentation / loss of connectivity	

**Region: Indonesian Borneo**

**Species: marbled cat**

**Habitat type(s): Peat-swamp forest, pristine dipterocarp forest (lowland and montane), mangrove forest, selectively logged dipterocarp forest (lowland and montane)**

**All areas in which Marbled Cats were detected have a high conservation value for marbled cats**

Parameter	Patch 1	Patch 2	Patch 3	Patch 4
Site Name	Sebangau National Park, Kalteng	Bukit Baka Bukit Raya National Park, Kalteng/Kalbar	Gunung Palung National Park, Kalbar	Flora and Fauna International Area (surrounding GP), Kalbar
Presence/absence of species	Detected (2006)	Unknown	Detected (2008)	Unknown
Conservation value	High	Insufficient data	High	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)				
Trend in population size (stable/declining/increasing)				
Current threats	Fire, illegal logging		Direct hunting	
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches			Flora and Fauna Reserve	
Potential for future connectivity with other patches	None (surrounded by rivers and sea)		Possible	
Projected future fragmentation / loss of connectivity	Possible			

Parameter	Patch 5	Patch 6	Patch 7	Patch 8
Site Name	Kelian Protection Forest, Kaltim Sighting (camera trap photo) S 00 03' 29.5"	Sungai Wain, Kaltim	Bukit Soeharto, Kaltim	Batu Beruk, Kaltim
Presence/absence of species	Unknown	Detected	Unknown	Unknown
Conservation value	Insufficient data	High	Insufficient data	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)				
Trend in population size (stable/declining/increasing)				
Current threats		Illegal logging, coal mining		
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches		None		
Potential for future connectivity with other patches		None		
Projected future fragmentation / loss of connectivity		Yes, palm oil		

Parameter	Patch 9	Patch 10	Patch 11
Site Name	Wehea Protection Forest, Kaltim	Tanjung Puting	Barito Ulu
Presence/absence of species	Unknown	Unknown	Unknown
Conservation value	Insufficient data	Insufficient data	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)			
Trend in population size (stable/declining/increasing)			
Reasons for absence/decline, if appropriate			
Estimated carrying capacity / habitat saturation			
Current threats			
Projected future trend in carrying capacity (habitat area and/or quality)			
Current connectivity with other patches		None	
Potential for future connectivity with other patches		None	
Projected future fragmentation / loss of connectivity		Yes (see current threats)	

**Region: MALAYSIAN BORNEO**  
**Species: MARBLED CAT**  
**Habitat type(s): DIPTEROCARP FOREST (LOWLAND AND MONTANE), MANGROVE FOREST, SELECTIVELY LOGGED**  
**DIPTEROCARP FOREST (LOWLAND AND MONTANE)**

Parameter	Patch 1	Patch 2	Patch 3	Patch 4
Site Name	Tabin Wildlife Reserve/Kulamba	Lower Kinabatangan River Region	Upper Kinabatangan and Segama Forest Landscape (inc Malua F.R and Danum)	Sapulut Forest Reserve
Presence/absence of species	Detected (2005)	Unknown	Detected (2009)	Unknown
Conservation value	High	Low (too fragmented and small)	High	low (large areas are already converted)
Relative abundance	Insufficient data	Insufficient data	High (relative to other sites, at least in one study site around Danum)	Insufficient data
Estimated population size (or estimated range)				
Current threats	Indirect hunting	Indirect hunting, incidental hunting, habitat destruction	Indirect hunting	
Trend in population size (stable/declining/increasing)				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches		No	Potentially yes (Tangkulap/Deramak ot/Segaliud Lokan, if the marbled cat will cross the Kinabatangan river)	
Potential for future connectivity with other patches		Yes (Kulamba)	No	
Projected future fragmentation / loss of connectivity		None (area gazette by law)		

Parameter	Patch 5	Patch 6	Patch 7	Patch 8
Site Name	Ulu Tungud Forest Reserve	Trus Madi Forest Reserve	Crocker Range National Park	Lanjak Entimau, Batang Ai (Sarawak)/ Bentung Kerihun (Kalimantan)
Presence/absence of species	Unknown	Unknown	Unknown	Unknown
Conservation value	Insufficient data	Insufficient data	Insufficient data	High (because of a large forest complex with suitable habitat)
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)				
Trend in population size (stable/ declining/increasing)				
Current threats				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation (based on K-values)				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches				Yes (Kayan Menterang)
Potential for future connectivity with other patches				Potential (Gunung Palung)
Projected future fragmentation / loss of connectivity				

Parameter	Patch 9	Patch 10	Patch 11	Patch 12
Site Name	Maludam	Samunsam/ Tanjung Dato	Palung Tau National Park	Lambir Hills National Park
Presence/absence of species	Unknown	Unknown	Unknown	Unknown
Conservation value	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)				
Trend in population size (stable/declining/increasing)				
Current threats				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches				
Potential for future connectivity with other patches				
Projected future fragmentation / loss of connectivity				



Parameter	Patch 13	Patch 14	Patch 15	Patch 16
Site Name	Tangkulap/Deramakot/Segaliud Lokan	Ulu Kalumpang	Gunung Mulu	Loagan Bunut
Presence/absence of species	Detected (2008)	Unknown	Unknown	Unknown
Conservation value	High	Insufficient data	Insufficient data	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)				
Trend in population size (stable/declining/increasing)				
Current threats	Indirect hunting, legal selective logging (Tangkulap only)			
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches	Potential yes (Upper Kinabatangan if marbled cats will cross the Kinabatangan river)			No
Potential for future connectivity with other patches	Potential yes (Lower Kinabatangan)			No
Projected future fragmentation / loss of connectivity				

**Region: BRUNEI**  
**Species: MARBLED CAT**  
**Habitat type(s): PRISTINE LOWLAND DIPTEROCARP**

Parameter	Patch 1
Site Name	Ulu Temburong
Presence/absence of species	Unknown but highly possible due to pristine nature of the forest
Conservation value	High
Relative abundance	Insufficient data
Estimated population size (or estimated range)	
Trend in population size (stable/declining/increasing)	
Current threats	Indirect hunting, logging, direct hunting
Reasons for absence/decline, if appropriate	
Estimated carrying capacity / habitat saturation	
Projected future trend in carrying capacity (habitat area and/or quality)	
Current connectivity with other patches	
Potential for future connectivity with other patches	
Projected future fragmentation / loss of connectivity	

**Region: INDONESIAN BORNEO**

**Species: BAY CAT**

**Habitat type(s): PEAT-SWAMP FOREST, DIPTEROCARP FOREST (LOWLAND AND MONTANE), MANGROVE FOREST, SELECTIVELY LOGGED DIPTEROCARP FOREST (LOWLAND AND MONTANE)**

**All areas, where Bay cats have been detected are classified as high conservation value**

Parameter	Patch 1	Patch 2	Patch 3	Patch 4
Site Name	Sebangau National Park, Kalteng	Bukit Baka Bukit Raya National Park, Kalteng/Kalbar	Gunung Palung National Park, Kalbar	Flora and Fauna International Area (surrounding GP), Kalbar
Presence/absence of species	Unknown	Unknown	Detected (1996)	Unknown
Conservation value	Insufficient data	Insufficient data	High	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)				
Trend in population size (stable/declining/increasing)				
Current threats		Illegal logging, conversion to plantation (oil palm and acacia)	Indirect hunting	
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches			Flora and Fauna Reserve	
Potential for future connectivity with other patches			Possible	
Projected future fragmentation / loss of connectivity				

Parameter	Patch 5	Patch 6	Patch 7	Patch 8
Site Name	Kelian Protection Forest, Kaltim Sighting (camera trap photo) S 00 03' 29.5"	Sungai Wain, Kaltim	Bukit Soeharto, Kaltim	Batu Beruk, Kaltim
Presence/absence of species	Unknown	Detected (camera-trap 2005)	Unknown	Unknown
Conservation value	Insufficient data	High	Insufficient data	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)				
Trend in population size (stable/declining/increasing)				
Current threats		Illegal logging		
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches	None	None		
Potential for future connectivity with other patches	None	None		
Projected future fragmentation / loss of connectivity	Yes, palm oil	Yes, palm oil		

Parameter	Patch 9	Patch 10	Patch 11
Site Name	Wehea Protection Forest, Kaltim	Tanjung Puting	Barito Ulu
Presence/absence of species	Unknown	Detected (observation more than 10 years ago probably 1986)	Detected (reported in 2003 Cat News)
Conservation value	Insufficient data	High	High
Relative abundance	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)			
Trend in population size (stable/declining/increasing)			
Current threats			Coal mining, logging
Reasons for absence/decline, if appropriate			
Estimated carrying capacity / habitat saturation			
Current threats		Illegal logging, plantations	
Projected future trend in carrying capacity (habitat area and/or quality)			
Current connectivity with other patches		None	
Potential for future connectivity with other patches		None	
Projected future fragmentation / loss of connectivity		Yes (see current threats)	

**Region: MALAYSIAN BORNEO**  
**Species: BAY CAT**  
**Habitat type(s): DIPTEROCARP FOREST (LOWLAND AND MONTANE), MANGROVE FOREST, SELECTIVELY LOGGED**  
**DIPTEROCARP FOREST (LOWLAND AND MONTANE)**

Parameter	Patch 1	Patch 2	Patch 3	Patch 4
Site Name	Tabin Wildlife Reserve/Kulamba	Lower Kinabatangan River Region	Upper Kinabatangan and Segama Forest Landscape (inc Malua F.R and Danum)	Sapulut Forest Reserve
Presence/absence of species	Unknown	Unknown	Detected (2008)	Unknown
Conservation value	Insufficient data	Low (too fragmented and small)	High (identified in 3 different forest blocks)	Insufficient data
Relative abundance	Insufficient data	Insufficient data	High (compared to other sites and records)	Insufficient data
Current threats		Indirect hunting, incidental hunting, habitat destruction	Indirect hunting (bushmeat), accidental hunting (hunters targeting other species), habitat degradation, conversion to oil palm	
Trend in population size (stable/declining/increasing)				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches			Yes (Tangkulap/Deramak ot/Segaliud Lokan if bay cats will cross the Kinabatangan river)	
Potential for future connectivity with other patches			No	
Projected future fragmentation / loss of connectivity				

Parameter	Patch 5	Patch 6	Patch 7	Patch 8
Site Name	Ulu Tungud Forest Reserve	Trus Madi Forest Reserve	Crocker Range National Park	Lanjak Entimau, Batang Air (Sarawak)/ Bentung Kerihun (Kalimantan)
Presence/absence of species	Unknown	Unknown	Unknown	Unknown
Conservation value	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)				
Trend in population size (stable/declining/increasing)				
Current threats				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation (based on K-values)				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches				
Potential for future connectivity with other patches				
Projected future fragmentation / loss of connectivity				

Parameter	Patch 9	Patch 10	Patch 11	Patch 12
Site Name	Maludam	Samunsam/ Tanjung Dato	Palung Tau National Park	Lambir Hills National Park
Presence/absence of species	Unknown	Unknown	Unknown	Unknown
Conservation value	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)				
Trend in population size (stable/declining/increasing)				
Current threats				
Reasons for absence/decline, if appropriate				
Estimated carrying capacity / habitat saturation				
Projected future trend in carrying capacity (habitat area and/or quality)				
Current connectivity with other patches				
Potential for future connectivity with other patches				
Projected future fragmentation / loss of connectivity				



Parameter	Patch 13	Patch 14	Patch 15
Site Name	Tangkulap/Deramakot/Segaliud Lokan	Ulu Kalumpang	Gunung Mulu
Presence/absence of species	Detected (2008)	Unknown	Unknown
Conservation value	High	Insufficient data	Insufficient data
Relative abundance	Insufficient data	Insufficient data	Insufficient data
Estimated population size (or estimated range)			
Trend in population size (stable/declining/increasing)			
Current threats	Indirect hunting, legal selective logging (Tangkulap only)		
Reasons for absence/decline, if appropriate			
Estimated carrying capacity / habitat saturation			
Projected future trend in carrying capacity (habitat area and/or quality)			
Current connectivity with other patches	Yes (Upper Kinabatangan if the bay cats will cross the Kinabatangan river)		
Potential for future connectivity with other patches	Potential Yes (Lower Kinabatangan)		
Projected future fragmentation / loss of connectivity			

**Region: Brunei**  
**Species: Bay Cat**  
**Habitat type(s): Pristine Lowland Dipterocarp**

Parameter	Patch 1
Site Name	Ulu Temburong
Presence/absence of species	Unknown
Conservation value	Insufficient data
Relative abundance	Insufficient data
Estimated population size (or estimated range)	
Trend in population size (stable/declining/increasing)	
Current threats	
Reasons for absence/decline, if appropriate	
Estimated carrying capacity / habitat saturation	
Projected future trend in carrying capacity (habitat area and/or quality)	
Current connectivity with other patches	
Potential for future connectivity with other patches	
Projected future fragmentation / loss of connectivity	

## Issues, Threats, Goals, and Actions for Felid Conservation in Borneo

The group split problems into:

- Threats - direct problems impacting on felids which were of conservation concern but which the participants felt there was (at the present time) little we could do to impact positively on these.
- Issues - indirect problems facing felids but which the group felt we were better placed to implement change.

The group then ranked each threat and issue based on the seriousness of the threat (threat level where 11 is the highest/most serious threat) and ability to take action (action level of which the participants felt they could directly contribute to change where 11 is the highest level at which we felt we could make a difference).

Number of dots for THREAT LEVEL	Number of dots for ABILITY TO TAKE ACTION	Indirect issues affecting effective conservation of Bornean cats
	11	Lack of information regarding the status, distribution, ecology and long-term trend data for felid species in range states
	8	Lack of standardization of methods and monitoring
		Lack of communication and information dissemination between researchers
		Lack of information regarding response of felids to the various threats
	2	Lack of funding especially for long-term or repeat studies
	3	Lack of motivated local candidates from range countries to carry out studies or environmental education
		Lack of capacity for range country scientists to carry out studies or environmental education
6	5	Lack of awareness, knowledge and empathy towards wildlife at the local level
1		Corruption
	1	Lack of law enforcement
		Lack of accurate forest cover maps (current and changing) and GIS data
		Lack of data on land cover changes (conversion, extraction rates etc)
	1	Lack of communication between different stakeholders

Number of dots for THREAT LEVEL	Number of dots for ABILITY TO TAKE ACTION	Direct threats to the cats
2	1	Fire (intentional and/or natural fires burning out of control due to habitat degradation).
		Natural drought linked to El Niño and climate change
1	1	Illegal collection non-timber forest products
4		Illegal commercial logging (selective)
		Legal commercial logging (conventional selective)
		Legal commercial logging (reduced impact)
11		Habitat conversion to plantation (palm oil, acacia etc)
		Habitat conversion to non-tree crops
		Habitat removal (mining)

2		Water pollution (agricultural run-off, heavy metal from mining)
		Direct hunting (bushmeat, skins, body parts)
		Trade in live cats
1		Incidental hunting (cats are not target species e.g. snares)
		Hunting of felid prey, fishing and frog hunting
		Disease
5		Habitat fragmentation/patch isolation (edge effects and inbreeding)
		Unsustainable tourism

## TOP THREATS TO FELIDS in Borneo

### 1. **Threat:** Habitat conversion to plantation (oil palm, acacia etc)

**Description:** Wide scale habitat conversion to oil palm plantations, eliminating suitable habitat for all Borneo felids with the possible exception of leopard cats. In previously logged areas there is an increased risk of conversion to plantation (through reduction in conservation value).

**Goals:**

- Reduce the impacts of current land conversion practices.
- Restore degraded forest.
- Encourage felid-friendly oil palm plantations.
- Advocate that unavoidable oil palm developments take place on already degraded or cleared land.
- Explore alternative commercial uses for the land that are more ecologically sustainable.

**Actions:**

- Felid researchers, biologists and educators need to keep current with developments in oil palm plantation policy. All researchers to monitor the Round Table for Sustainable Palm Oil (RSPO) website.
- Lobby for the RSPO to allow the participation of small, local NGOs. Susan Cheyne.

### 2. **Threat:** Lack of awareness, knowledge and empathy towards wildlife among range-country citizens.

**Description:** A broad lack of adequate knowledge of wildlife and conservation issues among rural and city dwellers resulting in behaviors which are detrimental to felid conservation. (non-governmental stakeholders such as plantation land-owners, local community members: both adults and children).

**Goals:**

- Develop education programs for sites across Borneo.

**Actions:**

- Determine potential in-country advisors and, with their assistance, identify sites with the greatest potential for conservation impact through the application of environmental education programming.
- With local collaborators, conduct assessment within the identified sites to develop the optimal environmental education strategy.
- Develop and implement environmental education program.
- Conduct evaluation of environmental education programs to determine effectiveness of messaging.

This is all already in place for Sebangau, but content needs to change to include felids more – Susan Cheyne.

All Bornean group members have agreed to work together on a standardized questionnaire for the local villages (which will not only include hunting questions etc, but also should include

questions about knowledge etc about the wildlife) and that we will assist each other in the establishing of environmental education actions.

**3. Threat:** Increasing isolation of small patches

**Description:** Even in protected areas, habitat conversion in adjacent areas can create edge-effects, inbreeding depression, and demographic instability which lead to populations that are too small and isolated to be sustainable in the long-term.

**Goals:**

Maintain and facilitate the increase and connectivity among patches of felid habitat patches.

**Actions:**

- Field research to assess felid population sizes inside isolated protected areas and the degree to which felids move through degraded habitats.
- Working close together with the government stakeholder:
- Discuss upcoming problems to raise their awareness about the consequences of fragmentation.
- Pointing out areas with a high conservation value (defined as areas which are the last connection between sites, or areas that could potentially be a corridor for wildlife in the future) to the local stakeholders.
- Implementing research results in Felid management plans (as it is planned for Sabah for the next years).

Andy Hearn, Joanna Ross, Andreas Wilting, Jedediah Brodie, Anthony Giordano.

Other threats for which goals and/or actions were not assessed:

Illegal and legal commercial selective logging.

Although the direct removal of timber from forests may or may not have a detrimental impact on felids, the associated impacts of road construction facilitates human access to previously inaccessible areas leading to higher risk of hunting, pollution and vehicle collisions.

**Goal**

- Reduce access to forest thereby reducing associated detrimental activities.
- Reduce hunting activities.
- Inform the managers of logging companies of sustainable selective logging practices.

**Actions**

**Communication between the local stakeholders to ensure the controls at the gates are more effective and reduce the illegal access**

Fire (intentional, natural fire out of control due to habitat degradation)

Water pollution (agricultural run-off, heavy metal from mining)

Corruption

Illegal collection non-timber forest products

Incidental hunting (cats are not target species e.g. snares)

## TOP ACHIEVABLE ISSUES

1. **Threat:** Lack of information regarding the status, distribution, ecology, long-term abundance trends, and felid responses to anthropogenic threats.

**Description:** There is a lack of baseline data on Bornean felid distribution, abundance, population trends, ecological needs, and their response to key threats. This lack of data precludes the development of effective conservation and management strategies.

**Goals:**

- a) Conduct studies to increase our knowledge of felid status distribution and ecology.
- b) Conduct ecological studies to increase our knowledge of felid response to anthropogenic change.
- c) Conduct long-term studies to collect population data (min 5yrs, recommended 10yrs).
- d) Conduct studies to investigate the effects of habitat fragmentation on felids.
- e) Conduct social surveys to determine human impact on felids (direct and indirect hunting).

### Actions

#### Current projects

Upper Kinabatangan and Segama Forest Landscape (inc. Malua F.R and Danum) Bornean Wildcats and Clouded Leopard – Andrew Hearn, Joanna Ross and Daniel Pamin – a, b, c  
Borneo Species Program – Raymond Alfred

- a (currently presence/likely absence only), b, c

Tabin Wildlife Reserve/Kulamba

Bornean Wildcats and Clouded Leopard – Andrew Hearn, Joanna Ross and Daniel Pamin

- a, e

Tangkulap/Deramakot/Segaliud Lokan

ConCaSa (Conservation of Carnivores in Sabah) - Andreas Wilting, Azlan Mohamed

- a, b, c

Lower Kinabatangan River Region

KOCP (Kinabatangan Orangutan Conservation Project) – Marc Ancrenaz, Azri Sawang

- a (currently presence/likely absence only), b, c, d

East Kalimantan, Wehea Protection Forest

Mulawarman University, Samarinda – Rustam

- a, b, c, e

Central Kalimantan, Sebangau National Park

Orangutan Tropical Peatland Project (Sebangau Felids) – Susan Cheyne

- a, b, e

#### Planned projects for 2009 which will carry out (or plan to start)

Multiple fragments in Sabah

Universiti Malaysia, Sabah – Henry Bernard

- a (currently presence/likely absence only), b, d

Palung Tau National Park, Gunung Mulu NP, Ulu Temborang NP (Malaysia) and Kayan Menterang NP (Indonesia)

Tropical Forest Group – Jedediah Brodie

- a, b, e

Gunung Palung NP, Betung Kerihun NP, Bukit Rongga Protection Forest (West Kalimantan, Indonesia); Lambir Hills NP (Sarawak, Malaysia)

S.P.E.C.I.E.S., Project Neofelis – Anthony Giordano

- a, b, d, e

#### Recommended priority areas for research (focusing on some or all of the above goals)

Small parks which are threatened by increasing isolation and large parks which are threatened by encroachment.

Find forest cover maps showing changes in forest cover for all of Borneo to identify priority areas – Anthony Giordano

Find GIS layers for watersheds to help identify flat-headed cat habitat – Anthony Giordano

2. **Threat:** Lack of standardized monitoring methods and communication between researchers.

**Description:** The lack of standardized felid assessment methods and communication among researchers limits the understanding of the broad-scale conservation situation. This lack also precludes direct comparisons of field data, thereby reducing the efficient use and impact of conservation resources.

**Goals:**

- Continue to work together to develop a standardized system for monitoring felids.
- Develop a system to facilitate ongoing communication between felid conservationists, biologists and educators working in Borneo.

**Actions:**

- Create an online forum for discussion between researchers, biologists and educators working in Borneo. Susan Cheyne, Anthony Giordano, Karen Povey. March 1.
- Provide our data on methods to new sites to facilitate the use of standard, accepted methods which are comparable. Everyone in working group.
- Produce a short video about setting up of cameras. This video will be shared with all the group members. The video will be in English and Bahasa Malaysia. Andreas Wilting and Azlan Mohamed

We will make a commitment to work together to produce a standard methods manual for surveying and monitoring. Separate working group headed by David Reed, University of Missouri and including Anthony Giordano.

3. **Threat:** Lack of awareness, knowledge and empathy towards wildlife among range-country citizens.

**Description:** A broad lack of adequate knowledge of wildlife and conservation issues among rural and city dwellers resulting in behaviors which are detrimental to felid conservation. (non-governmental stakeholders inc. plantation land-owners, local community members (adults and children))

**Goals:**

- Develop education programs for sites across Borneo.

**Actions:**

- Determine potential in-country advisors and, with their assistance, identify sites with the greatest potential for conservation impact through the application of environmental education programming. Karen Povey.
- With local collaborators, conduct assessment within the identified sites to develop the optimal environmental education strategy. Karen Povey.
- Develop and implement environmental education program. Karen Povey.
- Conduct evaluation of environmental education programs to determine effectiveness of messaging. Karen Povey.
- Investigate opportunities to distribute education program materials for more widespread use. Karen Povey.

This is all already in place for Sebangau, but content needs to change to include felids more. Susan Cheyne.

4. **Threat:** Lack of motivated local candidates from range countries to carry out studies or environmental education.

**Description:** There is difficulty identifying sufficiently trained and/or motivated candidates from within range countries to sustain research and environmental education programs.

**Goals**

- Increase level of training: through more availability of training we intend to get more interested and trained students.
- Increase availability of training.

**Actions**

- Providing and promoting training courses of local and international universities. Andreas Wilting, Andy Hearn, Joanna Ross, Susan Cheyne (WildCRU)
  - Provide funding for interested candidates to participate in these courses. Karen Povey
  - Integrating local students in existing felid research projects and education efforts. Henry Bernard/ Andrew Hearn / Joanna Ross / Andreas Wilting / Rustam / Raymond Alfred/ Karen Povey.
  - Providing local students the chance for an internship at an oversea university to gain further scientific experience.
  - Exchange of staff between field sites for additional training. Susan Cheyne / Andrew Hearn / Joanna Ross / Raymond Alfred / Andreas Wilting
5. Lack of funding especially for long-term or repeat studies 2
  6. Lack of law enforcement 1
  7. Lack of communication between different stakeholders 1
  8. Fire (intentional, natural fire out of control due to habitat degradation) 1
  9. Illegal collection non-timber forest products 1



# Clouded Leopard and Small Felid Conservation Summit Final Report

## Section 5

### Southern Thailand and Peninsular Malaysia Working Group Report



## Southern Thailand / Peninsular Malaysia Working Group

*Members: Visit Asaithammakul, Amos Courage, Passanan, Namfon Cutter, Sumate Kamolnorrnanath, Budsabong Kanchanasaka, Antony Lynam, Azlan Mohamed, Wanlop Chutipong Dusit Ngoprasert, Umpornpimon Prayoon, Boripat Siriaroonrat, William Swanson, Ampika Thongphakdee, Carl Traeholt,*

### Data Assembly and Evaluation

The working group members reviewed the data submitted prior to the workshop and provided the following additional data in order to complete the distribution tables for the target felid species in southern Thailand and peninsular Malaysia. The data are not complete for both regions but represents what could be extracted from the working group members at the workshop.

Due to insufficient data on population numbers, the group refrained from providing any population estimates for any of the felid species. The numbers in brackets denotes the minimum number of individuals that were recorded by camera traps only. Where possible the location number (on the GIS map) is provided, however, many surveys were conducted outside of the gazetted national parks, wildlife sanctuaries and other special protected areas and are stated by name only.

### CLOUDED LEOPARD

#### Thailand:

Clouded leopards recorded from tropical evergreen forests:

- Kang Krachan National Park (location # 127, camera trap, > 1 individual)
- Hala-Bala Wildlife Sanctuary (location # 66-67, camera trap, > 1 individual)
- Klong Saeng Wildlife Sanctuary (location # 57, camera trap, 8-9 individuals)
- Bang Lang National Park (location # 161, > 1 individual)
- Khao Sok National Park (location # 140, 1-2 individuals)
- Thaleban National Park (location # 32, direct sighting, 1 individual)
- Maenam Pachee Wildlife Sanctuary (location # 45, direct observation, 1 individual)

Absence:

- Not found in one survey attempt for Kang Krachan (mixed deciduous forest – Ban Krang Camp) (per A. Lynam)
- Maenam Pachee Wildlife Sanctuary (location # 45, mixed deciduous forest)

#### Peninsular Malaysia:

- Temengor Forest Reserve (A. Lynam reported additional records from camera trap survey)
- Krau WR (location #117, camera trap, > 1 individual)
- Taman Negara (location #5, camera trap, > 2 individuals)
- Endau-Rompin SP (location #67, camera trap, > 1 individual)
- Kluang-Kota Tinggi WR (location #132, camera trap, > 1 individual)
- Ulu Muda (camera trap, > 1 individual)
- Royal Belum SP (camera trap, > 1 individual) (all tropical evergreen forest, from camera trap)
- Bintang-Hijau Forest Reserve (camera trap, > 1 individual)
- Jengai Forest Reserve (camera trap, > 1 individual)
- Gunung Tebu Forest Reserve (camera trap, > 1 individual)
- Ulu Temiang Forest Reserve (camera trap, > 1 individual)
- Ayer-nga Forest Reserve (camera trap, > 1 individual)

Absence (“no recordings):

- Cameron Highlands
- Lepar Forest Reserve

## **MARbled CAT**

### **Thailand:**

- Klong Saeng Wildlife Sanctuary (location # 57, camera trap, >3 individuals)
- Hala-Bala Wildlife Sanctuary (location # 66-67, camera trap, > 1 individual)
- Kang Krachan National Park (location # 127, camera trap, > 1 individual) (Dusit KMUTT)

### **Peninsular Malaysia:**

- Taman Negara (location #5, camera trap, evergreen forest)
- Royal Belum SP (camera trap, evergreen forest)
- Krau WR (location #117, camera trap, evergreen forest)

## **FLAT-HEADED CAT**

### **Thailand:**

- Chalerm Prakiat Somdej Prathep Ratsuda Wildlife Sanctuary (location # 65)

### **Peninsular Malaysia:**

- Selangor Peatswamp forest (camera trap, observation)
- Pahang peatswamp forest (camera trap, observation)

## **ASIAN GOLDEN CAT**

### **Thailand:**

- Kang Krachan National Park (location # 127, camera trap, > 1 individual)
- Kui Buri National Park (location # 133-136, camera trap, > 1 individual, secondary growth dry evergreen forest)
- Klong Saeng Wildlife Sanctuary (location # 57, camera trap, >1 individuals)
- Halabala WS (camera trap)
- Manam Pachi WS (direct observation)
- Khao Luang NP (direct observation)
- Khao Sok NP (camera trap)

### **Peninsular Malaysia:**

- Royal Belum (camera trap, evergreen forest)
- Taman Negara (location #5, camera trap, evergreen forest)
- Krau WR (location #117, camera trap, evergreen forest)
- Kenyir FR (camera trap, evergreen forest)
- Sungkai WR (location #116, camera trap, evergreen forest)

## **LEOPARD CAT**

### **Thailand:**

- Manum Pachee (camera trap, mixed deciduous)
- Klong Saeng (camera trap, dry evergreen, secondary forest)
- Talay Noi (captive cat)
- Kor Ra/Kor Pra Thang (footprint, grassland, beach)
- Khao Luang (footprint, beach)
- Papru (chlaemphrakete) (direct sighting, melaleuca forest)
- Kang Krachan National Park (location #127, camera trap, > 1 individual, Dusit KMUTT)
- Kui Buri National Park (location # 133-136, camera trap, > 1 individual, Wanlop KMUTT & WWF)

### **Peninsular Malaysia:**

- Multiple locations – camera trap – all habitat types

**FISHING CAT**

- Kang Krachan National Park (location #127, camera trap, Dusit KMUTT)
- Khao Yam Roi Yot National Park (camera trap, > 1 individual, Passanan Cutter)

**JUNGLE CAT** – no additional data; never recorded in peninsular Malaysia

**BAY CAT** – never recorded in Thailand (outside of historical range)

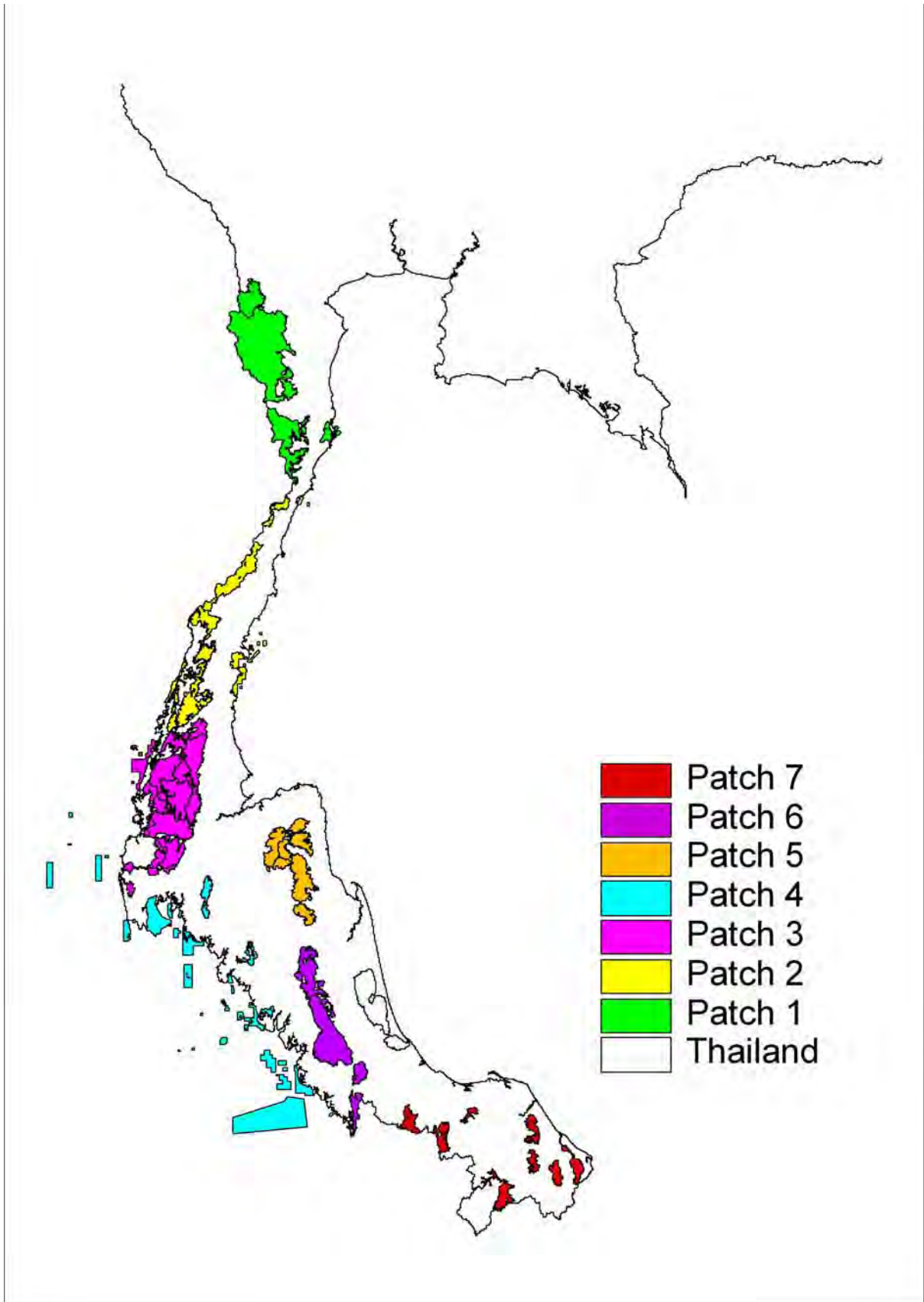
**Region: South Thailand**

**Species:** Clouded leopard (CL), marble cat (MC), fishing cat (FC), flat-headed cat (FHC), golden cat (GC), leopard cat (LC), jungle cat (JC).

**Habitat type(s):** Lowland evergreen, dry deciduous forest, grassland, peat swamp forest

Parameter	Patch 1	Patch 2	Patch 3	Patch 4	Patch 5	Patch 6	Patch 7
Presence/absence of species							
CL	Y	?	Y	?	?	Y	?
MC	Y	?	Y	?	?	?	?
FC	Y	?	?	?	?	?	?
FHC	?	?	?	?	?	?	Y
GC	Y	?	Y	?	Y	?	?
LC	Y	?	Y	?	?	?	Y
JC	?	?	?	?	?	?	?
Estimated population size (or estimated range)	NA	NA	NA	NA	NA	NA	NA
Trend in population size (stable / declining / increasing)	NA	NA	NA	NA	GC: decline	NA	NA
Reasons for absence/decline, if appropriate	NA	NA	NA	NA	GC: hunting	NA	NA
Estimated carrying capacity / habitat saturation	NA	NA	NA	NA	NA	NA	NA
Projected future trend in carrying capacity (habitat area and/or quality)	NA	NA	NA	NA	NA	NA	NA
Current connectivity with other patches	None	None	None	None	None	None	None
Potential for future connectivity with other patches	No	No	No	No	No	No	No
Projected future fragmentation / loss of connectivity	No	Yes	No	Yes	Yes	Yes	Yes

- Patch identification criteria for Thailand is based on A. Lynam's and DNP's protected area grouping.
- ? means no direct sightings or camera trap image available.
- Y means confirmed records of direct sightings or camera trap image available (1998-2008).
- NA means that available information was insufficient to use for determining presence/absence.



Map of patch locations in Southern Thailand (courtesy of Umpornpimon Prayoon)

**Region: Peninsular Malaysia**

**Species:** Clouded leopard (CL), marble cat (MC), fishing cat (FC), flat-headed cat (FHC), golden cat (GC), leopard cat (LC).

**Habitat type(s):** Evergreen rain forest, peat swamp forest

Parameter	Patch 8	Patch 9	Patch 10	Patch 11	Patch 12
Presence/absence of species					
CL	Y	Y	Y	?	Y
MC	Y	Y	?	?	?
FC	?	?	?	?	?
FHC	?	?	Y	?	Y
GC	Y	Y	Y	?	?
LC	Y	Y	Y	Y	Y
Estimated population size (or estimated range)	NA	NA	NA	NA	NA
Trend in population size (stable/declining/increasing)	NA	NA	NA	NA	NA
Reasons for absence/decline, if appropriate	NA	NA	NA	NA	NA
Estimated carrying capacity / habitat saturation	NA	NA	NA	NA	NA
Projected future trend in carrying capacity (habitat area and/or quality)	NA	NA	NA	NA	NA
Current connectivity with other patches	None	None	None	None	None
Potential for future connectivity with other patches	Maybe 8-9	Maybe 8-9	No	No	No
Projected future fragmentation / loss of connectivity	No	No	Yes	Yes	No

- Patch identification criteria for Malaysia is based on information provided by A. Lynam, C. Traeholt, and A. Mohamed
- ? means no direct sightings or camera trap image available.
- Y means confirmed records of direct sightings or camera trap image available (1997-2008).
- NA means that available information was insufficient to use for determining presence/absence.



### Identification and Prioritization of Key Issues Affecting Felids

From the initial brainstorming process, the group identified 26 different issues affecting felids in southern Thailand and peninsular Malaysia. These were eventually compiled to 16 issues and prioritized using the ‘sticky dots’ method (see table below) with respect to two criteria: 1) major conservation issues; and 2) issues that the working group members can affect.

The three issues in **bold** received top-priority. While “Habitat” received a high score as “a major conservation issue” it was not considered a priority, because the group deliberated that dealing with habitat would either fall beyond what is achievable for the group, or it would necessarily follow logically from, in particular, increased research effort and improved communication and networking with decision-making authorities.

Specific Issues	Major conservation issues (# dots)	Issues we can affect (# dots)
1. Habitat	9	
2. Prey depletion due to hunting (esp. clouded leopards)	2	2
3. Inbreeding problem	1	
4. Possibly pesticide use (esp. LC, FC, FHC)		
<b>5. Research</b>	9	6
<b>6. Lack of education</b>	1	8
7. Intra-guild competition		
8. Direct hunting		
9. Natural disaster		
10. Government policies	4	3
11. Diseases (known or potential)		
12. Alien species, or competition with invasive species		
<b>13. Lack of communication, networking</b>	3	7
14. Demographics of isolated populations		
15. Economics		2
16. Animal trade (especially CL, MC, LP)	1	2

### Identification of Goals and Recommended Actions

The development of the recommended actions, responsible parties, and measures of success was formulated based on the list of priority issues. A “measure of success” was identified for the top three priorities only. In several cases specific actions were not formulated (e.g., 3.2.2 and 3.2.3) because they were deemed beyond the current capacity and mandate of the group. Further, some of the goals necessitate multiple associated actions, which are interlinked and interdependent and it would not be meaningful to formulate theoretical action steps only.

The measurement of success is set at output level only (i.e., it refers directly to the specific action presented). The group was well aware that measuring impact at outcome level would be more meaningful in a conservation context; however, at this point in time the group interpreted the tasks to be limited to, primarily, outputs achievable in the CSG and associated network only. For Goals 4 – 7 the group did not identify any responsible person and did not formulate any measurements of success, because these were low priorities and unlikely to be addressed in addition to the top three priorities.

Issue 1: Research	Actions	Responsibility and Time	Measure of success
<p><b>Issue statement 1:</b> <i>Research data are needed to better understand population status and distribution to determine priority areas for conservation intervention.</i></p> <p><b>Goal 1.1:</b> Comprehensive research plan developed.</p> <p><b>Goal 1.2:</b> Ensure sufficient research capacity.</p> <p><b>Goal 1.3:</b> Ensure accessibility/ availability of adequate funding.</p>	<p>1.1.1 Identify priority species and patches. 1.1.2 Determine type of study for priorities identified in 1.1.1. 1.1.3 Develop initial study design of priority projects. 1.1.4 Develop budget estimates for priority projects. 1.1.5 Identify individual(s) and potential collaborators to undertake priority projects.</p> <p>1.2.1 Assess current capacity in range countries (Malaysia and Thailand) via networking.</p> <p>1.3.1 Identify funding sources. 1.3.2 Develop fundraising plan among researcher working on priority projects (coordinate &amp; cooperate). 1.3.3 Activate fundraising / proposal writing / submit proposals (individual researchers).</p>	<p>1.1.1-1-5 ALL, Thailand – Budsabong, Malaysia (Aug/Sept 2009)</p> <p>1.2.1 ALL (Dusit is contact person) / August 2009</p> <p>1.3.1-1-3 ALL parties (working group, Budsabong, Carl) (January 2010)</p>	<p><b>Goal 1:</b> List of priority species and patches List of study types Number and list of study designs Completed budget estimates for each study Number of studies with identified individuals to conduct the studies</p> <p><b>Goal 2:</b> Comprehensive list of researchers and ongoing projects</p> <p><b>Goal 3:</b> Comprehensive plan with lists of funding sources and priorities Number of successful fundings</p>
<p><b>Issue 2: Education</b></p> <p><b>Issue statement 2:</b> <i>Lack of education and awareness results in overuse/misuse of natural resources and indifference to loss and effect of biodiversity.</i></p> <p><b>Goal 2.1:</b> Education and awareness programs developed for public/ government.</p>	<p><b>Actions</b></p> <p>2.1.1 Review existing educational material in region. 2.1.2 Design, produce and disseminate education materials to relevant stakeholders. 2.1.3 Schedule educational and informational meetings with staff at relevant Government agencies in each country.</p>	<p><b>Responsibility</b></p> <p>2.1.1-2 (Namfon), Aug. 2009 (design/ revise if needed); Jan.2010 (disseminate as hard copies) 2.1.3.1 CSG member (Christine?), (Jan. 2010)</p>	<p><b>Measure of success</b></p> <p><b>Goal 1:</b> Increased awareness and knowledge of cats <b>Goal 2:</b> Completion of meetings</p>

Issue 3: Communication	Actions	Responsibility	Measure of success
<p><b>Issue statement 3:</b> <i>Lack of communication results in failure to implement available research findings and causes duplication of effort.</i></p> <p><b>Goal 3.1:</b> Establishment of a communication network among researchers.</p> <p><b>Goal 3.2:</b> Development of framework for mainstreaming research data in the Government sector (local and federal) as well as research institutions.</p>	<p><b>Actions</b></p> <p>3.1.1 Create plan for online network. 3.1.2 Establish online network (Yahoo, Facebook).</p> <p>3.2.1 Create a WG (GO staff, NGOs and researchers) to develop this framework. 3.2.2 Action federal level. 3.2.3 Action local level. 3.2.4 More actions (expansion of CSG??)</p>	<p>3.1.1-2 Dusit (ongoing)</p> <p>3.2.1.1 ALL (Carl for Malaysia, Budsabong for Thailand) (Jan. 2010)</p>	<p><b>Goal 1:</b> Plan completed Interactive network for communication amongst researchers</p> <p><b>Goal 2:</b> Formation of working group</p>
<p><b>Issue 4: Animal trade</b></p> <p><b>Issue statement 4:</b> <i>Animal trade causes depletion of wild cat populations, which could affect demographics and prey survival.</i></p> <p><b>Goal 4.1:</b> Reduction of occurrences of illegal trade in cats.</p>	<p><b>Actions</b></p> <p>4.1.1 Develop and conduct education campaigns in each locality. 4.1.2 Recruit volunteers to monitor/report on trade to Government agencies.</p>		
<p><b>Issue 5: Gov't Policies</b></p> <p><b>Issue statement 5:</b> <i>Lack of clear and holistic government policies and/or implementation results in habitat loss degradation/loss and eventual loss of biodiversity.</i></p> <p><b>Goal 5.1:</b> Development of clear Government policies, plans and programs (PPPs).</p> <p><b>Goal 5.2:</b> Ensure implementation of PPPs.</p>	<p><b>Actions</b></p> <p>5.1.1 Provide information to formulation of PPPs. 5.1.2 Offer assistance and guidance to development of PPPs. 5.2.1 Design monitoring systems to assess the level of policy implementation. 5.2.2 Provide continuous feedback to Government about policy issues (level of implementation, ambiguous situations, etc).</p>		

<p><b>Issue 6: Prey depletion</b></p> <p><b>Issue statement 6:</b> <i>Prey depletion reduces food availability, which can adversely affect survival of clouded leopards.</i></p> <p><b>Goal 6.1:</b> Reduction in hunting activities of CL prey.</p>	<p><b>Actions</b></p> <p>6.1.1 Increase patrolling at affected habitat areas. 6.1.2 Conduct education/monitoring campaign (similar to Issue 4).</p>		
<p><b>Issue 7: Habitat</b></p> <p><b>Issue statement 7:</b> <i>Loss, degradation and fragmentation of habitat can affect viability of wild cat populations.</i></p>	<p><b>Actions</b></p> <p>No goals formulated.</p>		

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## Section 6 Northern and Central Thailand / Myanmar Working Group Report



## North and Central Thailand / Myanmar Working Group

*Members: Myint Aung, Megan Baker, Karen Goodrowe Beck, Naris Bhumpakphan, Thattaya Bidayabha, Wanlop Chutipong, Kanda Damrongchainarong, Somphot Duangchantrasiri, George Gale, Selma Garrido, Lon Grassman, JoGayle Howard, Kate Jenks, Mongkol Kamsook, Antony Lynam, William McShea, Dusit Ngoprasert, Pornchai Patumrattanathan, Khanchai Prasanai, Parntep Ratanakorn, David Reed, Nakorn Slangsingha, Mayuree Umponjan, Worawidh Wajjwalku, Krearkpon Wongchoo*

### Data Assembly and Evaluation: MYANMAR

Hand drawn maps for Myanmar were provided by Myint Aung:

- Conducted wildlife surveys (interviews with photo ID, opinion questions) in areas where elephants were thought to be present.
- 2005-2006 data were divided by 7 states, then townships (n=105 out of 295).
- Found snow leopards in northern townships (3), leopards (45), tigers (5), golden cat (30), marbled cat (26), clouded leopard (33) in the north and along the western boundary; seems to be an overlap of small felid species, jungle cat (103), fishing cat (17) in south and delta, leopard cat (95).
- Some reports of selling pelts, cats captured by snares.

From 1999-2002, 17 sites were surveyed with camera-traps for tigers (data provided by Antony Lynam)

- Sites concentrated in the south and a few in the west.
- No data for Shan and Chin states.
- Clouded leopard (10 sites), only 4 species of cat with camera traps (clouded leopard, golden cat, tiger, leopard cat); no jungle or fishing cats, but researchers avoided open plains and wetland areas with camera setup.
- Wildlife trading is heading south, but it is thought that trade comes from India to Tachilek (borders with Thailand where there is evidence of clouded leopard pelts); trading in areas south of Dawei (Tavoy) near Bongtee; no fishing cats in markets or camera traps.
- See data from TRAFFIC regarding market surveys for cat species.

The working group decided to only focus on camera trapping data and leave out the market surveys for this discussion. Members worked together to combine the maps (the two maps generally agreed where there was overlapping information).

Camera traps were placed at 15 sites camera trapped. Sites were marked with 1 (=detected) or 0 (=non-detection) for four species (golden cat, clouded leopard, marbled cat, leopard cat). Indirect evidence was added. Areas ranged from approximately 3-4 km<sup>2</sup>, and roughly one month of survey was conducted in each place. Cameras were spaced using a grid intensively 1-2km apart in the center of the grid and then cameras were placed on trails leading outward from the center of the grid. Sites were sampled for tigers, so camera traps were not optimally positioned to detect jungle cats/fishing cats/flat-headed cats.

## Data Assembly and Evaluation: THAILAND

The working group was tasked with assessing clouded leopard and small felid distribution across most of Thailand (all but the southern peninsula). The group divided Thailand into three key areas:

- Northern Thailand (west of Phu Khieo) – note that the available dataset is based primarily on track data for leopard cats, which was not used in the final category of Detected.
- Western Forest Complex
- Rest of central Thailand excluding the peninsula (i.e., Khao Yai forest complex,, Phu Khieo forest complex, east to Cambodia border)

### Clouded Leopard

- Non-forest areas were excluded from clouded leopard habitat.
- There are 4 areas with known populations, but vast areas are unknown.
- Clouded leopards are present in Khao Yai (#121) and in the rest of Dong-Phayayen Forest Complex (WCS)
  - #126 PangSida = No (WCS)
  - #120 Thap Lan (yet to be detected)
  - Tapraya = Yes (WCS)
- The presence/absence of clouded leopards is unknown for Phu Phan Complex and sanctuaries to the east along the Cambodian border (there is evidence at #38 – Budsabong surveys)
- Phu Khieo complex ( #30) = YES
- Samruet (old records); partial survey with no clouded leopard records: unknown status to the south of Phu Khieo; YES in #65, #54, #74 (K. Somning; K. Budsabong and chief surveys per Naris)
- YES in complex #6 Doi Pachang Wildlife Sanctuary, YES in #65
- Unknown around #1
- Whole northern region is unknown for clouded leopards; other group had a NO for this area and only found in #6 (but uncertain as to where they surveyed)
- Western Forest Complex: Tung Yai East and West=YES, HKK = YES
  - Data from South of Tung Yai? 3 records >30 years (Narit)
  - Data from North of Tung Yai? Unknown
  - Lon Grassman can check out for data in southern region of the complex.
- YES for Khao Ang Rue Nai (#44?)
- #125 photos YES

### Fishing Cat and Leopard Cat

These two species were considered together because they both are found in agriculture areas.

- YES in Tung Yai West and East for leopard cat, fishing cat NO (after some discussion of how much surveying (n=4,000 trap nights), the group determined that it was necessary to go from 'unknown' to 'no')
- NO fishing cats detected in HKK (maybe because of "wrong" sampling; sampling design focused on tiger habitat)
- In our area of Thailand we know of NO data of presence of fishing cats (except Phu Khieo, where there is sign evidence and track sign corridor between Khao Yai and Thap Lan; also sighting in central Khao Yai!)
- Khao Yai, Khao Ang Rue Nai, Phu Khieo complex: leopard cats=YES
- Evidence from WCS for leopard cats and fishing cats
- Leopard cats in #36 and 119 (Dr. Naris) and #27 (Lon Grassman), #4, #6 (Dr. Naris), #30, #120 (Thap Lan), PangSida (Yes; WCS), Tapraya (Yes; WCS)
- Debate about whether or not to include leopard cat track signs (evidence of remote area, other surveys, etc.); no one votes against using the track signs in this case-by-case basis, so YES for leopard cat somewhere in the north...(will be recorded on map #4, #6)
- YES for leopard cats on the island of Samasan (Chonburi)

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### Golden Cat

YES in TapLan (WCS), PangSida (WCS), Phu Khieo, Khao Yai, Boogalen #70 direct sighting, HKK, Tung Yai West, #2 dead body, NamNaoew (#71), Phu Luang (#21), #105  
No in Khao Ang Rue Nai

### Marbled Cat

YES in Phu Khieo, Khao Yai, Dong Yai (#43), Huay Kha Kaeng (HKK), #2  
NO in Tung Yai West and northern protected areas, Khao Ang Rue Nai  
The remainder of Thailand is unknown with respect to marbled cat distribution.

### Jungle Cat

YES in Phu Khieo (Lon)  
NO from WCS sampled areas  
NO for Khao Yai, Khao Ang Rue Nai, Tung Yai West, and no sign from northern areas

### Flat-Headed Cat / Bay Cat

No distribution in the northern part of Thailand.

Once the working group evaluated all of the distribution and population data for felids in these areas of Thailand and Myanmar, a lengthy discussion ensued regarding population estimation. Members were not comfortable converting presence / absence data into population estimates. The group discussed three levels of ranking for abundance:

- healthy (if you place a camera trap in the right area, you will get a photo);
- marginal (species was detected, but at lower densities than other places; low frequency);
- extirpated.

The general grade of habitat quality correlates to presence / absence. However, it is unclear how to measure habitat quality. One possibility is to look at general variables such as human presence or patch size. Population numbers could be examined on a coarse level, but the group did not want to confound the independent variable habitat quality with the dependent variable population density. It was also thought that habitat quality changes on a finer scale (for these species) than the available scale of measurement. Direct comparison of RAI from camera traps is too difficult. Percent occupancy does not work with most surveys that are not set up for the target species.

The group decided that members were only comfortable with presenting presence / absence data. A categorization of abundance (high, medium, and low, in comparison to other areas in Thailand) and its variation across the landscape was an option for some of the well-studied patches such as HKK, Phu Khieo, and Khao Yai in Thailand.

### Clouded Leopard:

Khao Yai: detected, medium  
Phu Khieo: detected, high  
HKK (and Thung Yai): detected, low

### Leopard Cat:

Khao Yai: detected, high  
Phu Khieo: detected, high  
HKK: detected, high

Golden Cat:

Khao Yai: detected, medium  
Phu Khieo: detected, medium  
HKK: detected, low

Marbled Cat:

Khao Yai: detected, low  
Phu Khieo: detected, low  
HKK: detected, low

Fishing Cat:

Khao Yai: detected, low  
Phu Khieo: detected, low  
HKK: absent

Other cat species are absent for Thailand

**POPULATION AND HABITAT DATA for forest complexes in Myanmar**

<b>Parameter</b>	<b>Patch 1a (Kayah)</b>	<b>Patch 1b (TNT)</b>	<b>Patch 2 Bago Yoma</b>	<b>Patch 3 (Rakhine range)</b>	<b>Patch 4 (Chin Hills)</b>	<b>Patch 5 (NFC)</b>	<b>Patch 6 (Shan Yoma)</b>	<b>Patch 7 (Delta)</b>
Presence/absence of species	CL 1 MC 0 LC 1 GC 0 JC In FC 0	CL In MC In LC 1 GC 1 JC In FC In	CL 0 MC 0 LC 1 GC In JC In FC 0	CL 1 MC 1 LC 1 GC 1 JC In FC In	CL 1 MC 1 LC 1 GC 1 JC In FC 0 SL 1	CL 1 MC 1 LC 1 GC 1 JC In FC 0	CL 1 MC 0 LC 1 GC 0 JC In FC 0	CL 0 MC 0 LC In GC 0 JC In FC In
Estimated population size (or estimated range)	?	?	?	?	?	?	?	?
Trend in population size (stable/declining/increasing)	All dec	All dec	All dec	All dec	All dec	All dec	All dec	All dec
Reasons for absence/decline, if	All subsistence +	All subsistence	All subsistence +	All subsistence + CL Market	All subsistence +	All subsistence +	All subsistence +	All subsistence, +

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appropriate	CL Market hunting	+ CL Market hunting	CL Market hunting	hunting	CL Market hunting	CL Market hunting	CL Market hunting	CL Market hunting	CL Market hunting	Nargis cyclone
Estimated carrying capacity / habitat saturation	?	?	?	?	?	?	?	?	?	?
Projected future trend in carrying capacity (habitat area and/or quality)	Good potential	Good potential	No potential	Good potential	Good potential	Good potential	Good potential	Good potential	No potential	No potential
Current connectivity with other patches	Good connectivity	Connectivity but habitat degraded	Good connectivity	Good connectivity	Good connectivity	Good connectivity	Good connectivity	Good connectivity	No	No
Potential for future connectivity with other patches	Good	Good	No	Good	Good	Good	Good	Good	Some potential	?
Projected future fragmentation / loss of connectivity	Low	Low	High	Low	?	Low	Low	Low	High	?

**POPULATION AND HABITAT DATA for three major patches in north / central Thailand**

<b>Parameter</b>	<b>Khao Yai</b>	<b>Phu Khieo</b>	<b>HKK</b>
Presence/absence of species	See maps and 28Jan09_WorkGroup file		
Estimated population size (or estimated range)	See above by species		
Trend in population size (stable / declining / increasing) (by gut feeling)	Stable for everything in Khao Yai; unknown fishing cat and jungle cat 1999-2007	Increasing: clouded leopard, marbled cat, golden cat, leopard cat Decreasing: jungle cat, fishing cat 1997-2007	Increasing: leopard cat Stable: clouded leopard, golden cat Unknown: marbled cat, jungle cat, fishing cat 1993-2008
Reasons for absence / decline, if appropriate	Unknown	Unknown	Unknown
Estimated carrying capacity / habitat saturation	Unknown	Unknown	Unknown
Projected future trend in carrying capacity (habitat area and/or quality)	Unknown	Unknown	Unknown
Current connectivity with other patches	None (and fragmented within)	None	None
Potential for future connectivity with other patches	Very Low	Very Low	Medium
Projected future fragmentation / loss of connectivity	N/A	N/A	N/A

The following seven forest complexes were identified for Myanmar, based on the National Tiger Action Plan.

1 = Tenasserim Range

2 = Central Myanmar

3 = Rakhine Elephant Range

4 = Western Chin Hills

5 = Northern forest

6 = Shon Hills

No number = Lower Delta

The following nine habitat patches were identified for north / central Thailand. Species-specific information regarding these patches is presented in the following tables.

1 = Low Eastern Forest Complex (LEFC)

2 = Khao Yai Complex (Khao Yai)

3 = Transboundary area with Cambodia

4 = PoPong

5 = Phu Khieo

6 = PMPT (PumiamBooTong)

7 = Northern Thailand

8 = OngKoy (OK)

9 = Western Forest complex

#### Clouded Leopard / Marbled Cat / Leopard Cat / Golden Cat

Habitat patch	Habitat quality	Potential	Connectivity external to metapopulation	Internal Connectivity (within metapopulation)
1	Good; human influence	No, because of human activity; good potential if can control hunting	Poor	Good
2	Good		Low	Good
3	Poor	Depends on Cambodia	Good if connected to Cambodia	Poor
4	Poor	Poor; lots of human problems	Poor	Poor
5	Good	Good protection	Poor	Core areas well connected; moderate to high
6	Poor	Poor; uncontrolled hunting	Poor	Poor
7	Poor	Poor	Poor	Poor
8	Poor	Poor; people and livestock problems	Good habitat on Myanmar side	Poor
9	Good	Good; lower people problems	Good connection to Myanmar	Good

**Jungle Cat** (see notes on habitat quality; other categories are repeated from above)

Habitat patch	Habitat quality	Potential	Connectivity external to metapopulation	Internal Connectivity (within metapopulation)
1	Poor	No, because of human activity; good potential if can control hunting	Poor	Good
2	Good		Low	Good
3	Good, because of dry dipterocarp habitat	Depends on Cambodia	Good if connected to Cambodia	Poor
4	Good	Poor; lots of human problems	Poor	Poor
5	Good	Good protection	Poor	Core areas well connected; moderate to high
6	Good	Poor; uncontrolled hunting	Poor	Poor
7	Poor	Poor	Poor	Poor
8	Poor	Poor; people and livestock problems	Good habitat on Myanmar side	Poor
9	Good	Good; lower people problems	Good connection to Myanmar	Good

**Fishing Cat** (see notes on habitat quality; other categories are repeated from above)

Habitat patch	Habitat quality	Potential	Connectivity external to metapopulation	Internal Connectivity (within metapopulation)
1	Yes	No, because of human activity; good potential if can control hunting	Poor	Good
2	Good		Low	Good
3	Poor	Depends on Cambodia	Good if connected to Cambodia	Poor
4	Poor	Poor; lots of human problems	Poor	Poor
5	Good	Good protection	Poor	Core areas well connected; moderate to high
6	Poor	Poor; uncontrolled hunting	Poor	Poor
7	Poor	Poor	Poor	Poor
8	Poor	Poor; people and livestock problems	Good habitat on Myanmar side	Poor
9	Good (based on river system)	Good; lower people problems	Good connection to Myanmar	Good

## Identification of Key Issues Affecting Felids in Myanmar and Thailand

### MYNAMAR

The following issues were identified as those affecting clouded leopards and small felids in Myanmar.

- Lack of protected area coverage
- Management of protected areas
- Very little research (little knowledge accumulation)
- Little cooperation with adjoining countries
- **Difficult political environment**
- Law enforcement needed to combat wildlife trade
- Subsistence hunting because of poverty / hunger (probably affects small cats)
- Need to improve forest management (there is still LEGAL commercial logging going on and this inefficient / destructive plan is detrimental to wildlife)
- Increasing public awareness for cats with people who use the forests (locals and authorities at town and district level)
- Interactions with domestic dogs and wildlife (disease transmission); hunting dogs in the forest
- Defining roles of people doing conservation (e.g., police, township officials, university researchers)

A positive aspect for Myanmar is the existence of intact large patches of habitat, which provide a great potential for all species.

### THAILAND

The following issues were identified as those affecting clouded leopards and small felids in north / central Thailand.

- High human presence (collecting bamboo, forest products, etc.)
- Enforcement of present laws
- Inconsistent patrolling efforts (lack of organization)
- More public awareness for small cats needed
- No implementation of master management plans for protected areas
- Administration of reserves is from local / regional office; it might perhaps be better if it came from the central office (lack of ecological training; political decisions to choose local manager based on local needs that are not conservation friendly and not based on their knowledge and ability; lack of countrywide vision).
- Politicians from local community put their reputation and public approval first with no ecological training, and therefore decisions are not conservation friendly.
- Reserves are managed independently.
- Lack of research on prey for small felids
- Better education and awareness of wildlife needs to be communicated in zoos.
- Pollution from pesticides
- Prey depletion (within hunting)
- Communication between researchers
- Prioritization of projects
- Lack of funding
- Capacity building
- Standardization of methods
- Natural disaster
- Competition among carnivores
- Applicable research to support management

The working group then assessed the major threats across the various habitat patches in Thailand and Myanmar in the following tables.

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**THREATS by Forest Complex: MYANMAR (Clouded Leopards)**

Threat	Kayin	Tenasserim	Bago Yoma	Rakhime	ChimHills	NFC	Shan	Delta
Poaching	x	X					x	
Trade (primarily cross-border for Thailand market)	x	X					X hunting for Thai and Chinese market	
Human density			x					x
Habitat destruction (cyclone)								x
Habitat loss (dams)			x					
Incomplete coverage of forest; not enough areas are protected areas (broad issue for entire country)	x	X	x	x	x	x	x	x
Lack of protection (not paying rangers; collapse of management infrastructure; broad country-wide issue)	x	X	x	x	x	x	x	x
Most places no knowledge being accumulated (except tiger surveys by WCS; activities only in tiger reserves)	x	X	x	x	x	x	x	x
Lack of cooperation with adjoining countries; potential for trans-boundary parks (e.g. India, Thailand)	x	x	x	x	x	x	x	x

**THREATS by Forest Complex: MYANMAR (Small Felids)**

Threat	Kayin	Tenasserim	Bago Yoma	Rakhime	ChimHills	NFC	Shan	Delta
Poaching	x	X					x	
Trade	x	X					x	
Human density			x					x
Habitat destruction (cyclone)								x
Subsistence hunting	x	X	x	x	x	x	x	x
Habitat loss (dams)			x					
Poisoning fish for fishing (affecting fishing cat)				x				
Incomplete coverage of forest protected areas	x	X	x	x	x	x	x	x
Lack of protection (not paying rangers; collapse of management infrastructure)	x	X	x	x	x	x	x	x
Most places no knowledge being accumulated (except tiger surveys by WCS; activities only in tiger reserves)	x	X	x	x	x	x	x	x
Lack of cooperation with adjoining countries; potential for trans-boundary parks (e.g. India, Thailand)	x	x	x	x	x	x	x	x

**THREATS by Habitat Patch: THAILAND (Clouded Leopards)**

Threat	LEFC	Khao Yai	Trans-boundary	PoPong	Phu Khieo	PMPT	North Thailand	OngKoy	WFC
General poaching pressure (snare by-catch)	x	X	x	x	x	x	x	x	x
Poaching for alowood (indirectly from alowood poaching; poachers for wood hunt opportunistically for wildlife)	x	X	x	x	x	x	x	x	x
Pesticide and insecticide								x	
Hill tribe pressure (livestock raising, invasive agriculture)							x	x	x
UN Refugee camps from Myanmar (people go out hunting and collecting forest products)									x
Minority groups poaching for trade (focused hunting for the local and international markets)							x	x	x
Human settlement inside reserve					x	x	x	x	x
Highway (road kill issues)	x	X			x		x		
Landmines			x						
Threat of dam being built or current dam (people allowed inside for fishing and do other things)					x (future dam plans)			x	
Cattle encroachment		X	x			x		x	x
Excessive tourism (poor management of people)		X					x		

**THREATS by Habitat Patch: THAILAND (Small Felids)**

Threat	LEFC	Khao Yai	Trans-boundary	PoPong	Phu Khieo	PMPT	North Thailand	OngKoy	WFC
Poaching (snare by-catch; shotgun traps)	x	X	x	x	x	x	x	x	x
Poaching for alewood (indirectly from alewood poaching; poachers for wood hunt opportunistically for wildlife)	x	X	x	x	x	x	x	x	x
Pesticide and insecticide								x	
Hill tribe pressure (livestock raising, invasive agriculture)							x	x	x
UN Refugee camps from Myanmar (people go out hunting and collecting forest products)									x
Minority groups poaching for trade (focused hunting for the local and international markets)							x	x	x
Human settlement inside reserve					x	x	x	x	x
Highway (road kill issues)	x	X			x				
Threat of dam being built or current dam (people allowed inside for fishing and do other things)					x (future dam plans)			x	
Feral cats (possible disease transmission; competition)	x	X							
Excessive tourism (poor management of people)		X							

## **Prioritization of Habitat Patches and Key Issues**

The working group first ranked the habitat patches within each country to identify the high priority areas for conservation action, and then identified the priority issues (that the group had the ability to impact) in each area.

## **Prioritization of Forest Complex and Key Issues**

The working group first ranked the habitat patches within each country to identify the high priority areas for conservation action, and then identified the priority issues (that the group had the ability to impact) in each area.

### MYANMAR

The following forest complexes were identified as those that we (i.e., workshop participants and the organizations we represent) can actually access to do conservation:

- Tenasserim Hills: Taninthayi Nature Reserve
- Northern Forest Complex; Hukaung Tiger Reserve
- Rakhine Yoma Elephant Range

The priority issues (that we can impact) in these priority areas in Myanmar are as follows:

#### Tenasserim Hills (Myanmar)

- Subsistence hunting
- Market hunting and trade
- Difficult political environment (army groups)

#### Northern Forest Complex (Myanmar)

- Subsistence hunting
- Market hunting and trade
- Difficult political environment (army groups)

#### Rakhine Yoma Elephant Range (Myanmar)

- Subsistence hunting
- Increased public and government awareness
- Hunting and trade

People on the ground working in Myanmar (conservation oriented) may rank subsistence hunting as the key issue, whereas others unfamiliar with the situation on the ground gave priority to 'lack of knowledge'. The two working group members with experience in Myanmar decided on the top three issues for this country.

### THAILAND

Protected areas were ranked based on their conservation potential (potential to impact conservation) AND ones that we (i.e., workshop participants and the organizations we represent) have the ability to impact. Ranking was done using the 'sticky dot' method (3 dots per person)

- Phu Khieo (15 dots)
- Western Forest Complex (15 dots)
- Khao Yai (9 dots)
- Low Eastern Forest Complex (5 dots)
- Transboundary area with Cambodia (1 dot)
- Northern Thailand (1 dot)

The priority issues (that we can impact) in these priority areas in Thailand are as follows (# in parentheses indicates the # of dots received in the ranking exercise):

#### Phu Khieo (Thailand)

- Poaching (aloewood) (11)
- Management of protected areas (7)
- Human activity (6)
- Livestock encroachment (3)
- Highways (3)
- Law Enforcement (3)
- Lack of knowledge (6)
- Funding (3)
- Poaching (trade) (1)
- Dams (1)

#### Western Forest Complex (Thailand)

- Poaching (aloewood) (10)
- Human settlement in parks (9)
- Management of protected areas (9)
- Human activity (7)
- Law enforcement (7)
- Lack of knowledge (6)
- Poaching (trade) (4)
- Funding (1)

#### Khao Yai (Thailand)

- Poaching (aloewood) (10)
- Management of protected areas (10)
- Human activity (8)
- Highways (8)
- Law enforcement (5)
- Feral animals (2)
- Poaching (trade) (1)
- Lack of knowledge (1)
- Prioritization of projects (1)

#### Low Eastern Forest Complex (Thailand)

- Poaching (aloewood) (9)
- Poaching (trade) (6)
- Highways (6)
- Management of protected areas (6)
- Human activity (5)
- Law enforcement (5)
- Lack of knowledge (4)
- Feral animals (3)
- Livestock encroachment (2)
- Funding (2)
- Inconsistent patrols (1)

### **Identification of Goals and Recommended Actions**

The working group divided into two sub-groups (by country) to develop issue statements, goals, and recommended actions for priority areas for conservation impact. The following tables outline the actions for priority areas in Myanmar.

## Issues, Threats, Goals and Actions for Felid Conservation in Myanmar

### Rakhine Yoma Elephant Range Forest Complex, MYANMAR

Issues and threats	Goals	Actions	Target group	Measure of success
<p>Issue 1 : Subsistence hunting</p> <p>Threat statement: People living near felid habitats are poor and don't have enough food to eat, so they eat wildlife indiscriminately, leading to declines in felid populations.</p>	<p>Goal 1: Reduce levels of subsistence hunting to make it sustainable.</p>	<p>Conduct wildlife awareness presentations with target groups (Indo-Myanmar Conservation; Friends of Wildlife - local NGOs).</p> <p>Make agreements and provide incentives* to local people to find other sources of protein (Indo-Myanmar Conservation; Friends of Wildlife - local NGOs).</p>	<p>Ethnic (Chin) hunter groups</p>	<p>Decrease in rates of trapping/snaring as measured by patrol data.</p>
<p>Issue 2: Lack of awareness</p> <p>Threat statement: People in local government and local communities don't understand the importance of felids nor the effect of hunting or shifting cultivation on their populations.</p>	<p>Goal 2: Increase awareness about felids and impacts of shifting cultivation on felid populations.</p>	<p>* Provide (1) rice, (2) community forest plantation or private plantations on 30 yr land tenure; (3) provide at least one school teacher for each community.</p> <p>Study hunting patterns, determine areas used to trap and snare wildlife, remove traps/snares (Indo-Myanmar Conservation; Friends of Wildlife - local NGOs).</p>	<p>20 – 30 local communities inside or adjacent to felid habitats</p> <p>6 – 9 townships to township authorities and FD</p>	<p>Decrease amount of land under illegal shifting cultivation as measured by patrol data.</p> <p>Increase awareness as measured by questionnaires before and after program.</p>

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**Rakhine Yoma Elephant Range Forest Complex, MYANMAR**

Issues and threats	Goals	Actions	Target group	Measure of success
<p>Issue 3: Market hunting of felids, especially clouded leopard for skins, and other felids for meat</p> <p>Threat statement: People are poor so they sell skins of clouded leopards and meat of all felids to raise money to buy rice.</p>	<p>Goal 3: Stop market hunting and trade for clouded leopards and other felids.</p>	<p>Conduct wildlife awareness presentations with target groups (Indo-Myanmar Conservation; Friends of Wildlife - local NGOs)</p> <p>Increase patrolling efforts inside the forest reserves by providing training and support for patrol teams (Forest Dept).</p> <p>Monitor wildlife markets at Prome and Minbu for illegal trade (police, township authorities).</p> <p>Check roadside restaurants near the forest reserves (police, township authorities).</p> <p>Provide incentives* to enforcement staff to support more effective enforcement of markets and restaurants (IndoMyanmar Conservation; Friends of Wildlife - local NGOs).</p>	<p>20 – 30 local communities inside or adjacent to felid habitats</p> <p>Wildlife sanctuary patrol staff</p> <p>6 – 9 townships to township authorities and FD</p> <p>Owners of roadside restaurants</p>	<p>Decrease in rates of trapping/snaring as measured by patrol data.</p> <p>Decrease volume of clouded leopard parts in the Prome and Minbu markets.</p> <p>Decrease volume of felid meat for sale in roadside restaurants.</p> <p>Increase awareness as measured by questionnaires before and after</p>

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**Rakhine Yoma Elephant Range Forest Complex, MYANMAR**

Issues and threats	Goals	Actions	Target group	Measure of success
		* Traveling allowance when on patrols		program.
Issue 4: Insufficient management, roles and responsibilities of conservation staff not clearly defined (81 staff assigned but only 11 at the site)	Goal 4: Increase capacity for forest protection and management.	Provide training in patrolling and wildlife protection and survey techniques.  Provide equipment and field allowances.	Wildlife sanctuary staff (NWCDC)  Forest Department rangers	Increase in amount of time spent by staff in the field on patrol and in survey exercises.  Decrease in encounter rates with wildlife crime e.g. illegal persons and camps, traps/snates.
Issue 5: Lack of research and scientific knowledge about felids	Goal 5: Increase knowledge about status, distribution, ecology and behavior of felids.	Conduct surveys and ecological research inside the Wildlife Sanctuary (Indo-Myanmar Conservation; Friends of Wildlife - local NGOs).	Wildlife sanctuary staff (NWCDC)	Information generated by research is used in education programs and park management.

**Hukaung Tiger Reserve (Northern Forest Complex), MYANMAR**

Issues and threats	Goals	Actions	Target group	Measure of success
<p><b>Issue 1: Subsistence hunting</b> Threat statement: People living near felid habitats are poor and don't have enough food to eat, so they eat wildlife indiscriminately, leading to declines in felid populations.</p>	<p>Goal 1: Reduce levels of subsistence hunting to make it sustainable.</p>	<p>Conduct wildlife awareness presentations for local people and township authorities and peace groups (WCS). Conduct wildlife training with military personnel (WCS).</p>	<p>Local people Military personnel Township authorities Peace groups (KIO, Naga)</p>	<p>Decrease in rates of trapping/snaring as measured by patrol data.</p>

**Hukaung Tiger Reserve (Northern Forest Complex), MYANMAR**

Issues and threats	Goals	Actions	Target group	Measure of success
<p><b>Issue 2: Market hunting of felids, especially clouded leopard for skins, and other felids for meat</b></p> <p>Threat statement: People are poor so they sell skins of clouded leopards and meat of all felids to raise money to buy rice.</p>	<p>Goal 2: Stop market hunting and trade for clouded leopards and other felids.</p>	<p>Conduct wildlife awareness presentations with target groups (WCS).</p> <p>Increase patrolling efforts inside the forest reserves by providing training and support for patrol teams (NWCDC, Forest Dept).</p> <p>Monitor wildlife markets along the Ledo Road for illegal trade (WCS, Police, township authorities).</p> <p>Check roadside restaurants along the Ledo Road (Police, township authorities).</p> <p>Provide incentives* to enforcement staff to support more effective enforcement of markets and restaurants (WCS).</p> <p>* Traveling allowance when on patrols (WCS)</p>	<p>Local people</p> <p>Military personnel</p> <p>Township authorities</p> <p>People living in peace group camps (KIO, Naga)</p>	<p>Decrease in rates of trapping/snaring as measured by patrol data.</p> <p>Decrease in volume of clouded leopard parts in the Tanai markets.</p> <p>Decrease in volume of felid meat for sale in roadside restaurants.</p> <p>Increased awareness as measured by questionnaires before and after program.</p>

**Hukaung Tiger Reserve (Northern Forest Complex), MYANMMAR**

Issues and threats	Goals	Actions	Target group	Measure of success
<p><b>Issue 3: Loss and destruction of felid habitats</b></p> <p>Threats statement: Influential people build gold mines and plantations in the tiger reserve, which destroys felid habitats.</p> <p>Threat statement: Poor people do shifting cultivation inside the tiger reserve, which damages felid habitats.</p> <p>Threat statement: Military build camps inside the tiger reserve.</p>	<p>Goal 3a: Increase awareness about felids and impacts of shifting cultivation on felid populations.</p> <p>Goal 3b: Reduce impacts of official land use projects on felid habitats.</p> <p>Goal 3c: Reduce impacts of military camps on felid habitats.</p>	<p>Conduct wildlife awareness presentations (WCS).</p> <p>Make agreements and provide incentives* to local people to find other sources of protein.</p> <p>* Apply aspects of the model used by U Myint Aung in Rakhine Yoma Elephant Range</p>	<p>Influential people and decision-makers</p> <p>Local people involved in shifting cultivation</p> <p>Military commanders, peace group leaders</p>	<p>Decrease amount of land under illegal shifting cultivation as measured by patrol data.</p> <p>Decrease amount of land encroachment by gold mines and plantations as measured by patrol data and satellite imagery.</p>
<p><b>Issue 4: Lack of research, scientific knowledge about felids</b></p>	<p>Goal 4: To increase knowledge about status, distribution, ecology and behavior of felids.</p>	<p>Conduct surveys and ecological research inside the Tiger Reserve (WCS and NWCD).</p>	<p>Tiger Reserve staff (NWCD)</p>	<p>Information generated by research is used in education programs and reserve management.</p>

<b>Taninthayi Nature Reserve (Tenasserim Hills), MYANMAR</b>				
<b>Issues and threats</b>	<b>Goals</b>	<b>Actions</b>	<b>Target group</b>	<b>Measure of success</b>
<p><b>Issue 1: Market hunting of felids, esp. clouded leopard for skins, and other felids for meat</b></p> <p>Threat statement: People are poor so they sell skins of clouded leopards and meat of all felids to raise money to buy rice</p>	<p>Goal 1: Stop market hunting and trade for clouded leopards and other felids.</p>	<p>Conduct wildlife awareness presentations with target groups (WCS)</p> <p>Increase patrolling efforts inside the forest reserves by providing training and support for patrol teams (TNR)</p> <p>Monitor border wildlife markets for illegal trade (Police)</p> <p>Check roadside restaurants along the Ye - Dawei Highway (TNR)</p>	<p>Local communities inside or adjacent to TNR</p> <p>Gas company staff, road construction teams</p> <p>Kaleinaung Sub-township authorities and Forest Dept</p> <p>Owners of roadside restaurants</p>	<p>Decrease in rates of trapping / snaring as measured by patrol data</p> <p>Decrease volume of clouded leopard parts local/Thai border markets</p> <p>Decrease volume of felid meat for sale in roadside restaurants</p> <p>Increase awareness as measured by questionnaires</p>

### Taninthayi Nature Reserve (Tenasserim Hills), MYANMAR

Issues and threats	Goals	Actions	Target group	Measure of success
<p><b>Issue 2: Subsistence hunting</b></p> <p>Threat statement: People living near felid habitats are poor and don't have enough food to eat, so they eat wildlife indiscriminately, leading to declines in felid populations.</p>	<p>Goal 2: Reduce levels of subsistence hunting to make it sustainable.</p>	<p>Conduct wildlife awareness presentations for local people and township authorities (WCS).</p> <p>Conduct wildlife training with military personnel (TNRP, WCS).</p>	<p>Local people</p> <p>Military personnel</p> <p>Township authorities</p>	<p>Decrease in rates of trapping / snaring as measured by patrol data</p>
<p><b>Issue 3: Loss and destruction of felid habitats</b></p> <p>Threats statement: Influential people build tin mining and oil and rubber plantations in the tiger reserve which destroys felid habitats.</p> <p>Threat statement: Poor people do shifting cultivation inside the tiger reserve which damages felid habitats.</p> <p>Threat statement: Military build camps inside the tiger reserve.</p>	<p>Goal 3a: Increase awareness about felids and impacts of shifting cultivation on felid populations.</p> <p>Goal 3b: Reduce impacts of military camps on felid habitats.</p>	<p>Conduct wildlife awareness presentations (WCS).</p> <p>Make agreements and provide incentives* to local people to find other sources of protein (TNRP, WCS).</p> <p>* Apply aspects of the model used by U Myint Aung in Rakhine Yoma Elephant Range.</p>	<p>Local businessmen</p> <p>Local people involved in shifting cultivation</p> <p>Military commanders</p>	<p>Decrease amount of land under illegal shifting cultivation as measured by patrol data.</p> <p>Decrease amount of land encroachment by tin mines and plantations as measured by patrol data and satellite imagery.</p>
<p><b>Issue 4: Lack of international cooperation, including border</b></p>	<p>Goal 4: Increase cooperation between Thailand and Myanmar in cross-border trade</p>	<p>Higher level discussions (e.g. ASEAN, Ministerial) about wildlife trade.</p>	<p>Myanmar Ministry of Forestry, Defense, Home</p>	<p>Meetings held in international forums about issue of illegal trade between</p>

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**Taninthayi Nature Reserve (Tenasserim Hills), MYANMAR**

Issues and threats	Goals	Actions	Target group	Measure of success
<b>controls, CITES enforcement</b>	enforcement.	Training of border enforcement staff about wildlife trade (e.g. Forest Dept, Military, CITES, Customs).	<p>Affairs and equivalent Ministries in Thailand</p> <p>Customs, border police, border military of Myanmar and Thailand</p> <p>Local government authorities on both sides of the border</p> <p>Myanmar and Thailand CITES Management Authorities</p>	<p>Thailand and Myanmar.</p> <p>Increased level of surveillance of border markets and border crossings.</p> <p>Local government bodies issue policy directives about cross border illegal trade.</p> <p>Increased level of CITES activity at the border.</p>
<b>Issue 5: Lack of research, scientific knowledge about felids</b>	Goal 5: Increase knowledge about status, distribution, ecology and behavior of felids.	Conduct surveys and ecological research inside the Nature Reserve (WCS and TNRP).	TNRP staff	Information generated by research is used in education programs and reserve management.
<b>Issue 6: Destructive forestry harvest practices</b>	Goal 6: Stop illegal logging in the TNR.	Initiate dialogue with concerned stakeholders.	Some insurgent groups	Agreement to stop illegal logging in TNR (unlikely to be successful in current political climate).

## Issues, Goals and Actions for Felid Conservation in Thailand

### PHU KHIEO COMPLEX

ISSUE: Agarwood poaching is frequent and widespread (Thais and Cambodians), with tremendous financial incentive for the poachers. It involves groups of people in the forest for extended periods of time poaching (via snares and by-catch) as they move. This subsistence hunting results in the direct mortality of adult animals, which can drive populations to extinction.

GOAL: Control human activities and consequently stop poaching/activities that degrade habitat.

#### ACTIONS:

- Talk with Superintendents of protected areas and encourage them to agree on a standardized system for monitoring, law enforcement, data collection (MIST; already being considered by Chetchawan for wildlife sanctuaries), discouragement of illegal activity, and patrolling techniques.
  - PeunPa (Tim Redford, Deputy Director Field Operations, PeunPa Foundation, Tel.+6689 927 6066, Email: [peunjpa@csloxinfo.com](mailto:peunjpa@csloxinfo.com) ) to talk to WCS Thailand (Anak Pattanapibol, General Director, WCS Thailand) and WWF (Wanlop Chutipong, Email: [wchutipong@gmail.com](mailto:wchutipong@gmail.com)) about collaboration on this task to find common goals.
  - NGOs will discuss with Chatchawan Pitdamkham, General Director, Wildlife Conservation Office, DNP; and Suntorn Chaiwattana, Chief of Smart Patrol Operation Center, DNP.
- Ranger training for PK complex (there is already a model for mobile training, but we need to recruit and train trainers and need money for this).
- Use MIST database for patrolling information.
- Karen Povey will ask Chetchawan about distribution of the small felid/ clouded leopard story book for school groups.
- Selma will inquire at the U.S. Embassy about avenues/process for submitting grant proposals; and be open to discussions clarifying this process. Information to be distributed to Summit participants.
- Sustainable growth and harvest of agarwood.
- Effective patrolling and systematic snare removal.

GOAL: Increase knowledge regarding cat population numbers and trends, so we can tell if our protection activities are helpful. The first step in this includes research priorities.

#### ACTIONS:

- Continue long-term monitoring.
  - Estimate cat and prey base populations.
  - Standardize methods (camera trapping), datasheets, etc. across monitoring projects to estimate population sizes (or distribution changes).
  - Protocol for one park from each complex (eventually expanding to other protected areas in the complex).

#### List of Ongoing Projects:

1. George Gale, KMUTT (King Mongkut's University) ([george.and@kmutt.ac.th](mailto:george.and@kmutt.ac.th)); Antony Lynam, WCS Asia Program ([tlynam@wcs.org](mailto:tlynam@wcs.org)); Kanda Damrongchainarong, King Mongkut's University ([kanda\\_khoayai@gmail.com](mailto:kanda_khoayai@gmail.com)); David Reed, University of Mississippi ([dreed@olemiss.edu](mailto:dreed@olemiss.edu)) – looking at photos from camera trapping data for Thailand (habitat association models for clouded leopards, golden cats, marbled cats)
2. David Reed, Lon Grassman, Texas A&M University ([lon.grassman@tamuk.edu](mailto:lon.grassman@tamuk.edu)); Naris Bhumpakphan, Kasetsart University ([ffornrb@ku.ac.th](mailto:ffornrb@ku.ac.th)); KKOZ; Worawidh Wajjwalku, Kasetsart University ([fvvetwww@yahoo.com](mailto:fvvetwww@yahoo.com)); Wichan Eiadthong, Kasetsart University,



Wilting – Population genetics for the clouded leopard (gene flow between populations, length of separation between populations, etc.)

3. Megan Baker, Smithsonian National Zoo (bakermc@si.edu); Bill McShea, Smithsonian National Zoo (mcsheaw@si.edu); JoGayle Howard, Smithsonian National Zoo (howardjg@si.edu); Naris Bhumpakphan, Kasetsart University ([ffornrb@ku.ac.th](mailto:ffornrb@ku.ac.th)) – using camera traps to examine the interaction of clouded leopards with tigers and leopards in HKK or Phu Khieo (to look at competition); look at habitat associations.
4. George Gale, Bill McShea, Lon Grassman: Need study of BOTH camera trapping and radio telemetry.
5. Lon Grassman is willing to train students for telemetry study.
6. PeunPa ('friends of the forest') camera trapping project in Khao Yai complex; also training rangers for patrol and wildlife monitoring (specific to carnivores).
7. Khanchai Prasanai, Ph.D student at Kasetsart University (khanchai\_64@hotmail.com) – using camera trapping to predict carnivore and prey species (e.g., hog deer) at Phu Khieo
8. Mayuree Umponjan, Assistant Project Manager of WCS-Thailand (mumponjan@wcthailand.org) – tiger monitoring using camera traps in HKK/TY; long-term for 10 years (observing higher tiger numbers, lower clouded leopards)
9. Somphot Duangchantrasiri, Chief of Khao Nang Ram, Wildlife Research Station (somphot@gmail.com); Krearkpon Wongchoo, Khao Nang Ram's staff (kw\_fbio@hotmail.com) – tiger populations in HKK/TY using camera traps and radio-telemetry to study tiger ecology; also interested in using camera traps for small carnivores.
10. Mongkol Kamsook, Education Forest Officer; DNP – track survey project near Laos border may collect data on small felids; study from Phu Khieo about biodiversity
11. Wanlop Chutipong, King Mongkut University – camera trapping in TY for small carnivores
12. Dusit Ngoprasert, King Mongkut's University of Technology Thonburi (ndusit@gmail.com) – planned camera trapping for bears in KYNP
13. Kate Jenks (kjenks@wi.rr.com) – limited camera trapping in KARN

**Recommendation:** Work off of current tiger monitoring to get habitats and distance for camera monitoring for small felids.

- Randomize camera locations (but first maybe stratify by habitat; try evergreen forest first).
- One camera is okay for occupancy modeling (first step); then work toward density estimate (need two cameras to capture both sides of animal).

**Recommendation:** Share data between the four complexes for habitat association (existing and past studies). The contact person at each site is:

- HKK: Somphot (somphot@gmail.com)
- PKWS: Mongkol (pitakpri@hotmail.com; Phone: 089 573 6783)
- Khanchai (khanchai\_64@hotmail.com; Phone: 0898112767)
- DYKY: Thattaya (thattaya@peunpa.org; Phone: +6687 033 0121)
- LEFC: Kate (kjenks@wi.rr.com; Phone: 086-022-0977)
- Major contact person: George (george.and@kmutt.ac.th; Phone: 0816671211)

**Recommendation:** Attempt to expand habitats currently being sampled (change spacing of cameras and/or habitat).

- Bill and Megan will try alternative habitat in Phu Khieo.
- Potential for closer spacing in Khao Yai.
- HKK currently using 2-4km camera spacing.
- Need additional funding and staff to change spacing.

- TY planning 1km spacing.
- David: collaborative grant for more cameras.

#### MEASURES OF SUCCESS:

- Short term: increase in small felid capture rate
- Obtain funding
- Report for projects sharing data

ISSUE: There is inconsistent management and ranger training across the Phu Khieo complex. Uneven enforcement of laws and regulation leads to increased mortality of felid species in surrounding areas. While there is good patrolling in Phu Khieo Wildlife Sanctuary, the rest of the complex does not have good patrolling and therefore more poaching occurs.

ISSUE: Collection and use of forest products by local people degrades forest for animals and therefore lowers carrying capacity for cats.

ISSUE: There is a lack of knowledge regarding cat population numbers and trends, so we cannot tell if our protection activities are helpful if we are not monitoring populations. Also, lack of knowledge hinders our ability to rank the weight and urgency of these threats.

#### WESTERN FOREST COMPLEX

ISSUE: Poaching is frequent and widespread for subsistence and trade. This hunting causes the direct mortality of adult animals, which can drive populations to extinction.

ISSUE: Human settlement (Karen hill tribes) brings uncontrolled poaching, livestock, domestic animals (dogs, cats, pigs), and habitat degradation. Poaching directly influences populations, and the other threats impact carrying capacity.

ISSUE: There is inconsistent management and ranger training across the Western Forest complex. Uneven enforcement of laws and regulation leads to increased mortality of felid species in surrounding areas. While there is good patrolling in HKK and TY, the rest of the complex does not have good patrolling and therefore more poaching occurs.

#### KHAO YAI

ISSUE: Agarwood poaching is frequent and widespread (Thais and Cambodians), with tremendous financial incentive for the poachers. It involves groups of people in the forest for extended periods of time poaching (via snares and by-catch) as they move. This subsistence hunting causes the direct mortality of adult animals, which can drive populations to extinction.

ISSUE: There is inconsistent management and ranger training across the DYKY complex. Uneven enforcement of laws and regulation leads to increased mortality of felid species in surrounding areas. While there is good patrolling in Khao Yai, the rest of the complex does not have good patrolling and therefore more poaching occurs. There is no continuity in policies. No limits are placed on tourism, which is poorly managed. Tourism is a priority for the park above conservation, which leads to increased poaching, direct mortality by vehicle collisions, increased vehicle exhaust, increase in zoonotic disease transmission (from domestic animals and vehicles), and habitat degradation.

ACTION: Increase education and public awareness of clouded leopards and other small felids. Karen Povey is working with Friends of Khao Yai Foundation (PeunPa) on the distribution and evaluation of a clouded leopard storybook in Khao Yai (1.5 years).

**MEASURE OF SUCCESS:** Change in knowledge (measured via pre- and post-exposure surveys) of clouded leopards and other small cats; changes in behavior that will positively affect cat conservation.

Following evaluation, Karen Povey will contact the Director of the Wildlife Conservation Office (via staff of KUFF) to work with Education Supervisors to investigate feasibility of further distribution of this storybook throughout priority protected areas.

**MEASURE OF SUCCESS:** Change in knowledge of clouded leopards and other small cats; changes in behavior that will positively affect cat conservation.

### LOW EASTERN FOREST COMPLEX

**ISSUE:** Poaching (via snares, shotgun traps, and by-catch) is frequent and widespread for subsistence and trade. This hunting causes the direct mortality of adult animals, which can drive populations to extinction.

**ISSUE:** There is inconsistent management and insufficient patrolling across the complex. Uneven enforcement of laws and regulation leads to increased mortality of felid species in surrounding areas.

**ISSUE:** Highways give people access for poaching, increase habitat degradation, isolate/fragment populations, and result in direct vehicle mortality. All of these factors can negatively affect felid populations.

### **OVERALL MEASURES OF SUCCESS OF THE ACTIONS FROM THIS WORKSHOP:**

- Short term (2 years): increase in small felid detection rate during focal surveys because of improved methods of detecting them.
- Long term (10 years+): increase in small felid detection rate because of increased felid populations (once standardized protocols are established).
- Increased publications from the members of this working group on small felids in scientific and professional literature (5 years) (i.e. increased knowledge).
- Increased number of wildlife sanctuaries using MIST (5 years).
- Report for projects sharing data (within a year).
- Some grant funding was obtained for proposed projects (1-2 years).

**OVERALL RECOMMENDATION:** Follow-up meeting after 3 years



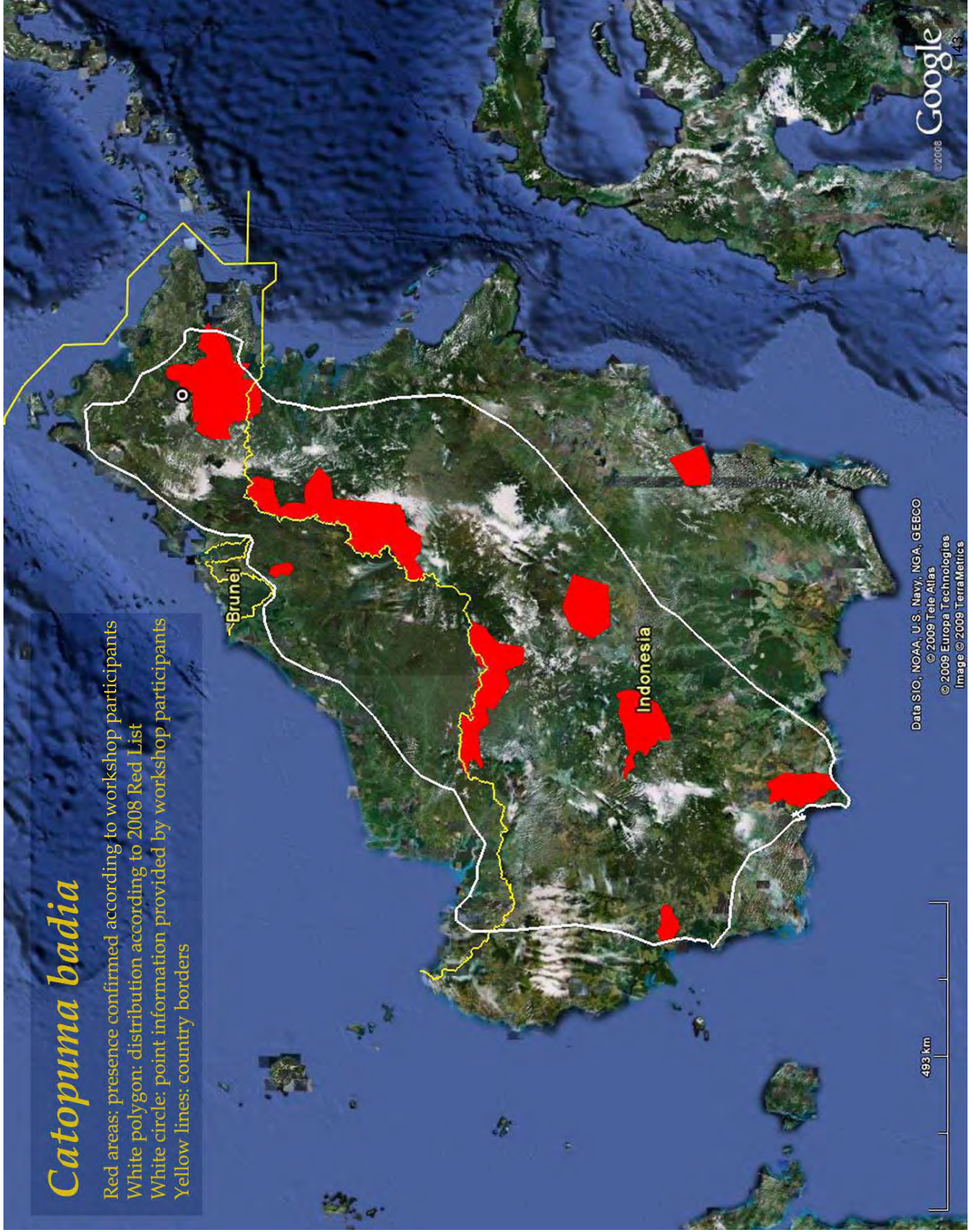
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## Section 7 Species Distribution Maps



# *Catopuma badia*

Red areas: presence confirmed according to workshop participants  
White polygon: distribution according to 2008 Red List  
White circle: point information provided by workshop participants  
Yellow lines: country borders



Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
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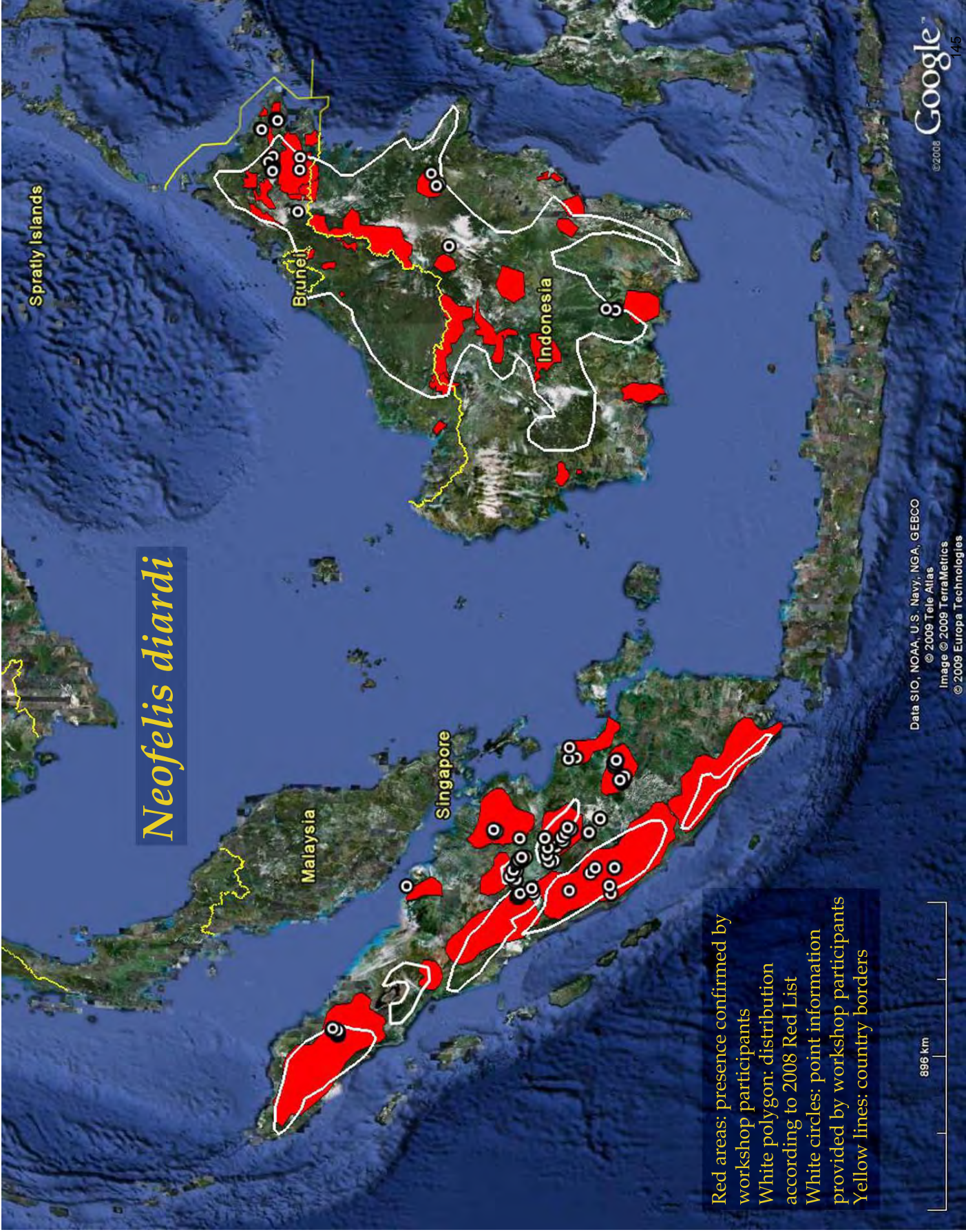


# *Catopuma temminckii*

Red areas: presence confirmed by workshop participants  
 Pink areas: presence probable  
 White polygon: distribution according to 2008 Red List  
 White circles: point information provided by workshop participants  
 Yellow lines: country borders



# *Neofelis diardi*

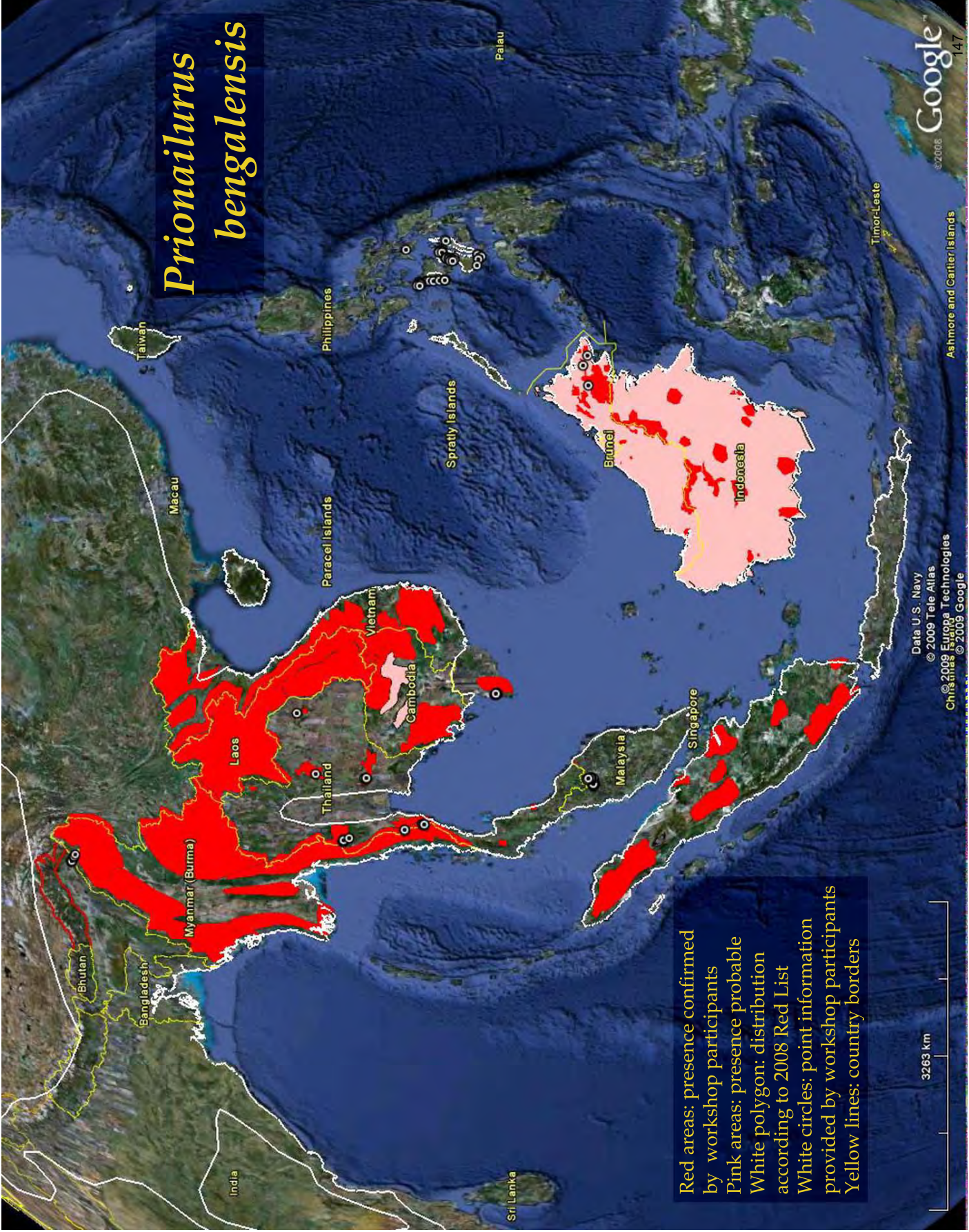


# *Neofelis nebulosa*

Red areas: presence confirmed by workshop participants  
Pink areas: presence probable  
White polygon: distribution according to 2008 Red List  
White circles: point information provided by workshop participants  
Yellow lines: country borders



# *Prionailurus bengalensis*



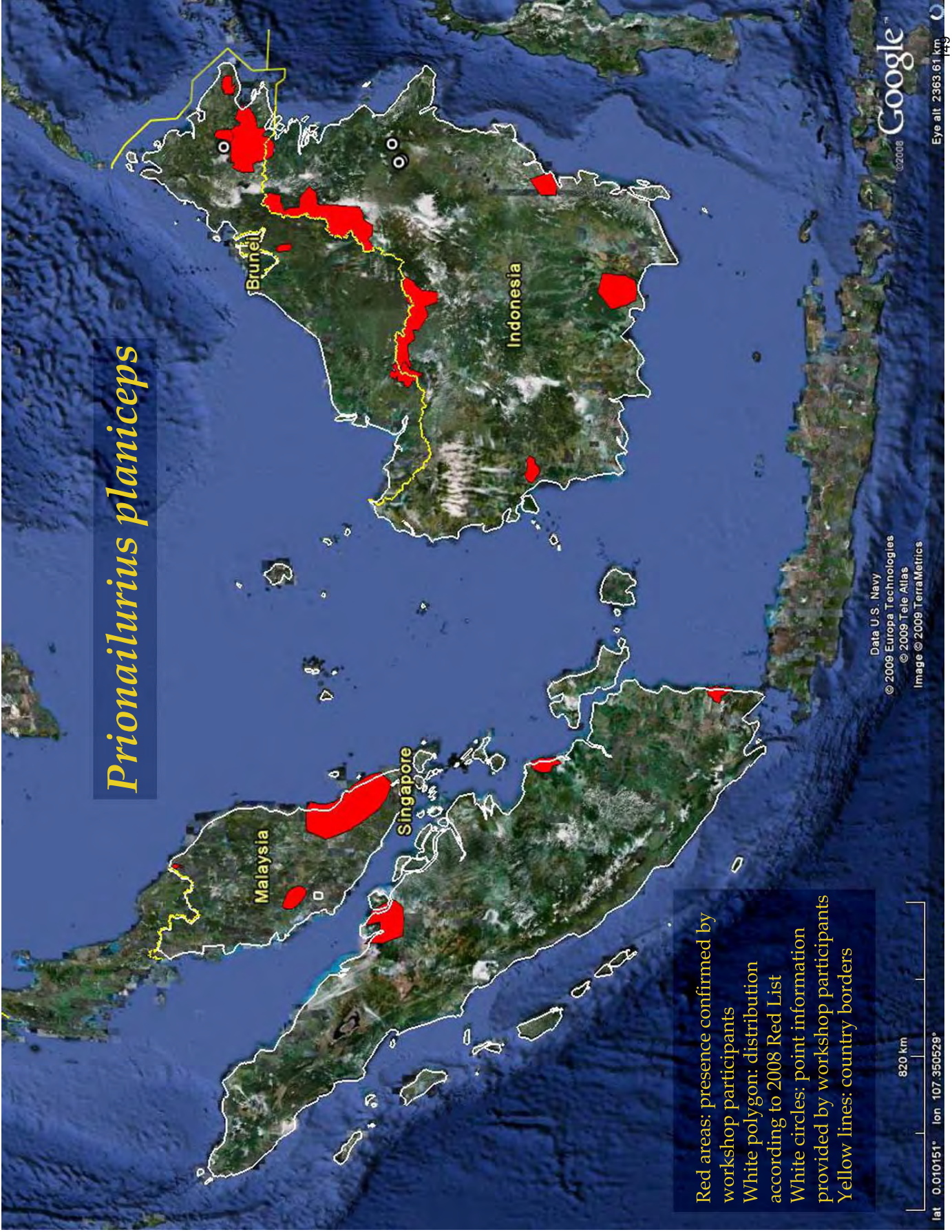


# *Pardofelis marmorata*

Red areas: presence confirmed by workshop participants  
 Pink areas: presence probable  
 White polygon: distribution according to 2008 Red List  
 White circles: point information provided by workshop participants  
 Yellow lines: country borders

2066 km

# *Prionailurus planiceps*



# *Prionailurus viverrinus*

Red areas: presence confirmed by workshop participants  
Pink areas: presence probable  
White polygon: distribution according to 2008 Red List  
White circles: point information provided by workshop participants  
Yellow lines: country borders



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## Appendix 1 Participant List and Introductions





## Workshop Participants

Name	Affiliation	E-mail
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## Participant Introductions

At the opening of the Summit, participants were asked to introduce themselves and answer the following questions:

- What species do you work with and in what country?
- What do you hope will be accomplished during this workshop?
- What do you hope to contribute?

Karen Povey, Point Defiance Zoo & Aquarium, Tacoma, WA; Clouded Leopard Project

- Clouded leopards – Thailand and Borneo
- Create a network of felid conservationists and develop a detailed plan for felid conservation in the region.
- Development of educational initiatives to address conservation issues

Kathy Traylor-Holzer, CBSG

- General population biology and modeling expertise
- Compile all available information (from published to expert opinion) on these felid species across their range, and develop the next steps toward effective conservation action.
- General facilitation and population models as a tool in decision making as appropriate.

Arlyne Johnson – Wildlife Conservation Society

- Work in Laos on tiger and tiger prey, as well as small carnivores (felids, viverrids, mustelids).
- To improve understanding of the status of small felids, gaps in knowledge and priorities for research and conservation.
- Knowledge of small felids and conservation needs in Laos.

William McShea, Smithsonian Institution

- Deer and large mammal surveys – currently in Thailand but worked in all countries in SE Asia
- Identify and fund key projects.
- Knowledge of survey techniques.

Thattaya Bidayabha – Field Biologist/Field Project Coordinator – Peun Pa Foundation

- All data about clouded leopard and small felids around SEA; coming to share and start to set up an active management plan in this region.
- Several years field experience in Dong Thayayen-Khao Yai Forest Complex.

David Reed – University of Mississippi/CBSG

- Thailand
- Clear conservation objectives formed.
- Collaboration with those needing quantitative or genetic expertise.

Antony J. Lynam – WCS Asia program

- Tigers and large mammals
- Contribute information on clouded leopard and small felid status and distribution for Peninsular Malaysia, Thailand and Myanmar.

Budsabong Kanchanasaka – Wildlife Research Division, Department of National Parks, Wildlife and Plant

- Conservation
- Carnivores
- To share information about the ecology and distribution of clouded leopards and small felids in Thailand and in the whole region.
- Some information about the habitat and range of the clouded leopard and small felid.

Lon Grassman – Texas A&M University

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- From 1997-2005 studied the biology of clouded leopards, Asiatic golden cats, leopard cats, marbled cats leopard cats and leopard and other species in Thailand.
- Would like to see open and accessible communication between researchers and conservation organizations across all the range countries.
- Contribute mainly biological/ecological information on Asian felids.

William Swanson – Cincinnati Zoo; Co-Chair, AZA Felid Taxon Advisory Group

- Fishing cats in Thailand
- Develop a clearer understanding of status of small felids throughout SE Asia and their conservation needs.
- Explore the linkages of *ex situ* and *in situ* populations for holistic conservation programs.

Azri Sawang – HUTAN Sabah, Malaysia

- Bornean Orangutan
- Compile all available data.
- Can contribute knowledge and experience.

Karmila Parakkasi – WWF Indonesia

- Sumatran Tiger in Indonesia
- Share with and learn from others (research techniques, etc.); specific projects.
- Information on wild cats in my study area and items to identify how big the threat is to these species.

Karma Gyamtsho – Bhutan

- Ph.D. student, KU – works as a park ranger

Khanchai Prasanai – Ph.D. student in Forestry Faculty at KU, khanchai\_64hotmail.com

- Working with wildlife reintroductions at Phu Khieo Wildlife Sanctuary, doing research on hog deer ecology.

Thananh Khotpathoom – Faculty of Forestry, National University of Laos; presently a M.S. student at the faculty of Forestry, KU

- Interested in new species of rodent that have just been discovered in Laos and if it is a new species (Kha Nyou – *Laonastes aegmanus*).
- Hope to gain more experience on wildlife research, especially on field research techniques.
- Because I don't have a lot of experience, I hope to learn about wildlife.

Wanlop Chutipong – MS student in Conservation Ecology Program, King Mongkut's University of Technology Thonburi, Bangkok and WWF Thailand

- Leopard cat, golden cat, clouded leopard – Thung Yai Neresuan Wildlife Sanctuary (Western Thailand); leopard cat, golden cat – Kuigun Kuiburi National Park (Southern Thailand)
- Accomplish the objectives of this workshop with my help.
- The information I have from field work including distribution and relative abundance of leopard cat, golden cat and clouded leopard.

Umpornpimon Prayoon - MS student, Faculty of Forestry, KU

- I want to learn more about small felids.

Mongkol Kamsook – DNP Thailand

- All wildlife and plants in Thailand
- Network conservation felid and habitat areas.
- Every country participates in joint conservation of felids and habitat sites.

Rustam – Tropical Rainforest Research Center, Mubaararan (?) University, Indonesia

- I research mammals with camera trap method in East Kalimantan Indonesia.
- I hope during this workshop I can share data and learn more about clouded leopards and small felids, make a network for saving habitat and share information.

Tim Redford – Freeland/Peunpa Foundation

- Carnivores in general and how they represent conservation and a large scale
- Create better understanding on status, distribution and threats to small felids and clouded leopards. To share realistic interventions.
- Crystallize ways our foundation's work can be aligned with other groups, especially on illegal trade and awareness.

Iding Achmad Haidar – Kerinci Seblat NP & Flora International Indonesia Program

- Make good linkages and communication with all participants; to share and compile the data that I have from Janibi, South Sumatra, West Sumatra and Bengkulu Province (Sumatra, Indonesia).
- Contribute in site planning of clouded leopards and other felids.

Somphot Duangchantrasiri – Department of National Parks, Wildlife and Plant Conservation

- Tiger research - population and ecology in Huai Kha Khea and Thung Yai Wildlife Sanctuary
- I would like to share everyone's knowledge and add data for our study.

Wilson Novarino – Andalas University, West Sumatra

- Focusing on Malayan tapir by using camera traps. Sometimes we also get small felid images such as golden cat and leopard cat.
- Learn more about small felids and make a good network with others.
- Share my data and experience and current communication issues in Sumatra.

Mayanee Umponjam – WCS Thailand

- Assistant project manager in Tigers Forever Project in Thailand – we work with Khao Nang Ram wildlife research station.

Yongyurt Trisurat – Faculty of Forestry, KU

- Hornbill, Elephant
- Pragmatic strategies for cat conservation in the region
- Landscape ecology; apply geo-informatics for cat conservation

Po-Jen Chiang – Experimental Forest of National Taiwan University

- Clouded leopard, its prey and other sympatric carnivores in Taiwan
- Communicate, seek collaboration, exchange information.
- Contribute understanding of cats in Taiwan, share experiences in analyzing camera trap data.

Kate Jenks – Smithsonian Institution

- Carnivore monitoring in Thailand
- I hope during the workshop we will be able to share data and really get a concrete idea of what data are out there for these species.
- I hope to contribute my knowledge from camera trap surveys in Khao Yai National Park, Thailand.

Megan Baker – Smithsonian Institution

- Work with Bill McShea with his deer projects. However, I look to start my graduate work in Thailand working with clouded leopards.
- I look to meet all of you to pick your brains about field research and techniques in camera trapping surveys in Southeast Asia.
- Although I have not started my research, Bill McShea and I have given our time to create the maps that are going to be used in the working groups.

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Jennifer McCarthy – University of Massachusetts, Amherst

- Clouded leopards, golden cat, marbled cat – Sumatra, Indonesia
- I hope we will develop a strong framework for the collection of ecological data on these species.
- I hope to contribute any relevant knowledge from our fieldwork.

George Gale – Conservation Ecology Program, King Mongkut's University of Technology Thonburi, Bangkok (for ~ 11 years)

- My students are working on small carnivores. I also have one new student who would like to work on clouded leopards for a thesis.
- Understand the available data on clouded leopards and other small felids/carnivores and possible research project priorities for students and collaborators.
- A couple of my students have data from sites around Thailand to share on clouded leopards and small carnivores.

Dusit Ngoprasent - Ph.D. student – Conservation Ecology Program, King Mongkut's University of Technology Thonburi, Bangkok

- Leopard and Asiatic black bear in Thailand
- Network
- Contribute camera data I have in Kang Krachan National Park.

Kreakpon Wongchoo – MS student, Faculty of Forestry, KU

- Small carnivores from camera trapping

Dolly Priatna – Zoological Society of London, Indonesia Project

- Large mammals, especially tigers and am interested in other cats in Sumatra, Indonesia
- Comprehensive information about the population status of clouded leopard and other small cats; networking between felid researchers
- Knowledge of distribution of felids in Sumatra as well as knowledge of education programs and radio/GPS for cats.

Visit Asaithammakul – Veterinarian, Khao Kheow Open Zoo, Zoological Park Organization of Thailand

- Zoo animals – felids, primates of Thailand
- To learn situation and knowledge of *in situ* cat populations to support links between *in situ* and *ex situ* populations.

Kuenzang Dorsi – Bhutan; Instructor, Ugyen Wangchuk Environmental & Forestry Institute

- 3 years experience in camera trapping
- Hope to learn more about small felids from the workshop and come up with a conservation plan for small felids in Bhutan.
- We hope to join the group as a member under the Cat Specialist Group

Parntep Ratanakorn – Associate Professor – Faculty Veterinary Science, Mahidol University

- Wildlife Health – elephants, tigers in Thailand
- Network of Research/service
- Experience in captive breeding and reintroduction/field research; conservation medicine.

Naris Bhumpakphan – Department of Forest Biology, Faculty of Forestry, KU

- My responsibilities are teaching wildlife courses and conducting research on ungulates.
- I really want to share my experience and data during the workshop.
- I want to work with our friends with ideas and data to support the long-term survival of small felids in the range countries.

Theerapat Prayurasiddhi – Director of Planning and Information Office, Department of National Parks, Wildlife and Plant Conservation, Thailand

- IUCN Wild Cattle Specialist Group
- Bring all knowledge from this conference to make a plan to manage protected areas/decrease conflict between humans and wildlife and establish network on wildlife conservation.
- Our Department's concept is wildlife without borders.

Selma Garrido – US Embassy, Thailand

- No specific species focus
- Gain better understanding of social and economic drivers that threaten the felid population in Thailand. Learn about current conservation strategies and understand where strategies/information needs to improve.
- US government perspective and view points from someone who does not have a biology or scientific background.

Kanda Damrongchainarong – MS student in Conservation Ecology Program, King Mongkut's University of Technology Thonburi, Bangkok

Conservation of elephants

- Interested in clouded leopards and want to pick it up for my research study. Gain much more information to conserve these endangered cat species for this region

Sumate Kamolnorrath – ZPO of Thailand

- *Ex situ* conservation, research and education – conduct 20+ research projects/year
- Sustainable use – conservation breeding for wild zoo animals, especially on endangered species and endemic species
- Creating an action plan for the conservation breeding of clouded leopards; what and how ZPO can help clouded leopard and small cat conservation.

Boripat Siriaroonrat – ZPO Thailand

- Eld's deer, sarus crane, clouded leopards in Thailand
- Regional network and interest group for small cats; action plans and priorities; new contacts and collaborations.
- Experience from Clouded Leopard Consortium and Khao Kheow Open Zoo and others (e.g. flat headed cat); disease and genetics, captive breeding of small cats in Thailand.

Worawith Wajjwalku – Faculty of Veterinary Medicine, KU

- Molecular genetics and animal health

Carl Traeholt – Copenhagen Zoo/Department of Wildlife and National Parks, Malaysia

- Malay Tapir – looking into starting up a program on flat-headed cats
- Exchange information, get good ideas and expand net-working.

Barney Long – WWF Asian Species Program, IUCN Small Carnivore Specialist Group

- Mammals in general throughout SE Asia, especially in Indochina; tiger focus now
- Identify specific sites and conservation needs – especially for clouded leopards and jungle cat.
- Conservation lessons from across Asia.

Rajanathan Rajaratnam (Raj) – University of New England, NSW, Australia

- Leopard cats – Borneo (Sabah), Philippines
- A long-term achievable plan to combine field research, education and community/stakeholder participation into a conservation plan for small felids in SE Asia, taking into account varying regional environments.
- Field experience and knowledge, particularly with the effect of commercial agriculture on small felids.



Nguyen Van Nhuan – researcher, Carnivore & Pangolin Conservation Program, Cuc Phuong National Park, Vietnam

- Small carnivores and pangolin; current focus on fishing cat and otters in field survey in Mekong Delta
- Develop communication system and data on species status.
- Contribute data on small cats in Vietnam and provide some information on issues about small cat conservation in Vietnam.

Andrew Hearn – Global Canopy Program, Sabah Malaysian Borneo

- Species of felids found in Borneo – clouded leopard, marbled cat, leopard cat, flat headed cat, bay cat
- Improve current knowledge on the status and distribution of the SE Asian felids and identify future steps.
- Contribute our project’s knowledge of the distribution of the Bornean felids in Sabah.

Raymond Alfred – WWF Malaysia

- Elephants, orangutans, rhinos in Sabah
- Hope to know the direction of the clouded leopard conservation work globally and in Borneo.
- Contribute knowledge of habitat programs and survey tracking.

Susan Cheyne – WILD CRU, University of Oxford

- Asian apes, clouded leopards, small felids and forest ecology in Indonesia
- Sharing of data and study methods. Meeting other felid specialists. Combine management plans for apes and felids.
- Preliminary data on clouded leopards and small felids in peat-swamp-forest.

Joanna Ross – Global Canopy Program, Sabah Malaysian Borneo

- Species of felids found in Borneo – clouded leopard, marbled cat, leopard cat, flat headed cat, bay cat.
- Identify key threats and form workable solutions to these and form plans for long-term monitoring of populations; communication between cat biologists.
- Contribute distribution data from Sabah.

Andreas Wilting – Leibniz Institute of Zoo and Wildlife Research, Berlin, Germany

- Sunda clouded leopard, flat-headed cat, Bornean bay cat, leopard cat, marbled cat; also small carnivores
- Sharing and compiling data from various regions and setting up action plans.
- Some data from Sabah – north-eastern part of Borneo; genetics expertise; non-invasive field methods.

Azlan B. Mohamed – University of Malaysia, Sabah

- General wild cat in Sabah, Borneo
- I want to establish a good network and a database on these cats and develop a management and action plan for conservation of clouded leopard and small cats in Southeast Asia.
- Share information and data from my study.

Haryo T. Wibisono – Tiger Forever initiative for the WCS Indonesia program in Sumatra

- Tigers – Sumatra
- To provide a better understanding of clouded leopard population status as well as a clear follow-up for clouded leopard and small cat conservation in Sumatra.
- We have done little specifically for clouded leopards and small cats but we have a 6 year data set of camera trapping survey in southern Sumatra. I hope to contribute our data to this meeting as well as our experience in working in Sumatra.

JoGayle Howard – Smithsonian Institution

- Clouded leopard and all small felids – Thailand
- Develop a network group and identify action steps needed to gain more information on these wild cats and conduct a news conference to gain public awareness.
- My knowledge and experience in cat biology and share our information on the status of wild cats in Thailand.

Passanan Cutter

- Research fishing cats in Thailand
- Hope to see a long-term plan of small felid conservation.
- To contribute what I have learned about fishing cats.

Myint Aung – Smithsonian Institution Burma Program

- Eld's deer, elephants and other large mammals; community relations and participation in conservation in Myanmar
- To understand the current situation of cat species conservation and to make suggestions on cat species conservation in Myanmar.
- The status and distribution of felid species in Myanmar.

Anthony J. Giordano – Texas Tech University

- Clouded leopards – Indonesia (Sumatra), fishing cats – Bangladesh
- Better idea of species status, needed conservation actions; identify priorities for research and conservation for the foreseeable future.
- My role as a partner in initiating/conducting new research, facilitating conservation efforts; identify clearly our project objectives in the regions I am working in; anything I might know about the status of these species in the regions I am working in; my knowledge of survey/capture techniques for carnivores and non-invasive sampling.

Jedediah Brodie – University of Montana; Asia Section, Society for Conservation Biology

- Clouded leopard, Sarawak (Malaysia)
- Formation of a collaboration network and strategic plan for felid conservation in SE Asia.
- Research on clouded leopard habitat selection and demography; general wildlife ecology and population modeling.

Vijak Chimchome – Faculty of Forestry, KU

- Hornbills in Thailand; has students working on bears and small carnivores in Thailand
- Get a good action plan for conservation; gain more knowledge.
- Share knowledge and experience.

Karen Goodrowe Beck – Point Defiance Zoo & Aquarium, Tacoma WA

- Support *in situ* and *ex situ* clouded leopard programs in Thailand and Borneo.
- Learn about clouded leopards and small cats in SE Asia; Identify specific actions for clouded leopard and small cat conservation that can be implemented through this collaborative network.
- Help provide financial and resource opportunities to allow the identified projects from this meeting to be carried out.

Nick Marx – Wildlife Alliance in Cambodia; association with the Aspinall Foundation and Howletts.

- Working with all species in Cambodia, addressing the illegal trade, care for rescued wildlife and subsequent rehabilitation and release if appropriate.
- Network for felid/wildlife conservation; identify threats and how to deal with them; information from surveys of cat species in the southern Cardamons of Cambodia where we work conserving the forest.
- Assistance within Cambodia for network for conservation of cats/wildlife.

Ampika Thongphakdee – Research veterinarian, Zoological Park Organization of Thailand

- Small felids; works with genome resource banking and assisted reproductive technologies
- Get knowledge, update information.
- Further collaboration about genetic management, captive breeding programs and assisted reproductive technologies.

Sunarto – Virginia Tech & WWF

- Works on the ecology of wildcats, especially Sumatran tigers, and other mammals in Sumatra
- Collaboratively update the status of wildcats in Southeast Asia and lay out what need to be done to make sure their continued survival.
- Contribute some presence data and share experience in conserving the wildcats in a multi-use landscape.



# Clouded Leopard and Small Felid Conservation Summit Final Report

## Appendix 2 Invitation and Invitation List





คณะวนศาสตร์ มหาวิทยาลัยเกษตรศาสตร์

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## Clouded Leopard and Small Felid Conservation Summit

January 28-30, 2009  
Kasetsart University  
Bangkok, Thailand

15 July 2008

Dear Colleague,

You are invited to attend a workshop focusing on the development of conservation initiatives for wild clouded leopards and small felids in Southeast Asia, to be held at Kasetsart University in Bangkok, Thailand on January 28-30, 2009.

The three-day workshop will bring together various stakeholders in Southeast Asia to exchange information; identify key issues relating to research, trade, and community education; and create strategies for future collaborative efforts to benefit clouded leopard and small felid conservation.

Kasetsart University's Faculty of Forestry has invited IUCN's Conservation Breeding Specialist Group (CBSG) and IUCN's Cat Specialist Group to facilitate this workshop with the following goals:

- Develop a collaborative communication network among stakeholders working on Southeast Asian felid research, conservation and education initiatives.
- Assess population status and update range maps of clouded leopards and small felids as a result of data compilation before and during the workshop.
- Create action steps and funding priorities to begin the development of a long-term, comprehensive clouded leopard and small felid conservation plan for the region.

Information on demography, environmental factors pertinent to population status and risk of extinction, threats to the species and their habitats, and the presence (or absence) of clouded leopards and small felids in Southeast Asia will be assembled in preparation for and use during the workshops. You are asked to provide any information and data you have (published or unpublished) for the workshop briefing book. Even if you cannot attend, please contribute information so that we have as complete and accurate a picture as possible of the current situation facing the clouded leopards and small felids of Southeast Asia.

A final report from this Conservation Summit will be compiled by CBSG and will contain participant contact information, workshop goals, meeting outcomes, and action steps developed during this workshop. The Cat Specialist Group will devote an issue of *Cat News* to publicize meeting findings and outcomes.

A public program/media event is scheduled on the evening of Jan. 30 to highlight the meeting outcomes. We also are exploring the possibility of a group trip opportunity to a protected area in Thailand on the weekend following the meeting (Jan 31- Feb 1, 2009).

### **Workshop Registration**

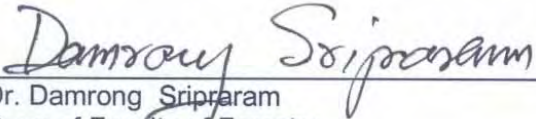
Cost for the workshop will be 6,000 Thai Baht (\$ 180 US dollars). This fee will include meals, refreshments and workshop materials. Information on hotel accommodations, airport transportation, and the possible post-workshop excursion trip will be sent at a later date.

As space is limited, we ask that you let us know immediately if you plan to attend the workshop. **Please register by sending the attached form to Karen Povey at [karen@cloudedleopard.org](mailto:karen@cloudedleopard.org).** While we hope that your institution will support your attendance at this important event, please let us know if you are unable to attend without financial assistance.

You have been identified as a valuable contributor to the Clouded Leopard and Small Felid Conservation Summit. We hope you will be able to join us in Bangkok for what promises to be an important event for promoting the conservation of clouded leopards and other Asian small felids.

We look forward to having you at the workshop. If you have any questions, please do not hesitate to contact us.

Sincerely,

 (signature)  
Dr. Damrong Sripraram  
Dean of Faculty of Forestry  
Kasetsart University



## Workshop Invitation List

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